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JPRS 83719

20 June 1983

USSR Report

LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 36

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AGROTECHNOLOGY

BRIEFS

EFFECTIVE CORN SEED PRE-TREATMENT--The energy of young corn sprouts in the spring field may be increased if the seeds are pre-treated with zinc. Their enrichment with this microelement before sowing is recommended by the Scientific-Technical Council of the republic Ministry of Agriculture. The simple but effective agricultural method has augmented the industrial technology of cultivating a valuable grain culture. The author of this innovation--chairman of the Executive Committee of the Nisporenskiy Rayon Soviet of People's Deputies I. Paylik conducted research under the supervision of scientists at the Institute of Physiology and Biochemistry of Plants, Moldavian SSR Academy of Sciences. The optimal dosage of concentration of zinc sulfate has been established at which the "starting" plants easily overcome the action of eradican--a herbicide which is destructive to weeds and which somewhat inhibits the initial growth of the culture plant. A mere 17 grams of the microelement is sufficient to ensure the necessary "energy charge" for seeds located on a hectare of field area. The treatment method consists of moistening the seeds with the microfertilizer solution. This may be done simultaneously with their disinfection. Production tests have shown that this presowing agricultural method ensures an average yield increase of up to seven centners per hectare. The quality of the seed is improved. It has an increased content of starch and irreplaceable amino acids. [Text] [Kishinev SOVETSKAYA MOLDAVIYA in Russian 6 Mar 83 p 2] 12322

NEW BELORUSSIAN WHEAT--Belorussian geneticists and breeders have presented a new variety of wheat "lyubov'" [love] for government testing. It was developed with the participation of Belorussian physicists.

At the Institute of Physics of the Belorussian SSR Academy of Sciences, I was shown a unique fan made of wheat-ears, each different in appearance and color. There were some which looked like couch-grass, some awned, some gymnospermous, some blackened, and some large-grained.

"All these are children of the same mother--the 'leningradka' variety of wheat which is most widespread in Belorussia", explained the director of the biological group of the laboratory on laser systems and instruments at this institute, I. Khokhlov. "They became this way after the seeds were irradiated with a laser beam. Each of the wheat-ears represented here has its own specific feature--either low growth, or increased protein content in the grain, or early maturation, or friability of the ear. And this is important for breeders, since they obtain different initial material for further work.

The idea of putting the laser to work for medical men and breeders in the republic became a reality when the laboratory on laser systems and instruments was created at the Institute of Physics of the Belorussian SSR Academy of Sciences. This laboratory included two groups: laser specialists and biologists. One group designs quantum generators of various function, including application in medicine and biology. The other group studies the effect of the beams from these instruments on living organisms. It is here that the physicians of the Sixth Minsk Clinical Hospital, who used lasers for curing a number of ailments, received support. And now the geneticists in the republic have the opportunity of using this means for affecting plants.

In order to accelerate the selection of initial plants for developing new varieties, breeders have long used the practice of irradiating seeds with gamma and x-ray radiation and treated them with chemical substances. Such a seed usually gives a deformed offspring, and only half of those sown survive. From among the deformed plants those having the necessary qualities were selected and cross-bred with plants having other useful properties.

Tests have shown that under the effect of the laser beam, the hereditary characteristics of plants change, but the viable force of the seeds is not suppressed. They have significantly better survival and yield more varied offspring of good viability.

"We are working in close contact with our co-workers at the Institute of Genetics and Cytology of the Belorussian SSR Academy of Sciences and with the Scientific-Research Institute of Agriculture", clarifies I. Khokhlov. The subject is under the direction of Academician L. Khotyleva, Director of the Institute of Genetics and Cytology, Belorussian SSR Academy of Sciences. In seven years, broad testing has been conducted on the various regimes of irradiating seeds, and the optimal ones have been selected.

The practical result of the research has become the new variety of wheat "lyubov" (geneticists humbly call it a variety, and not a strain. After government tests, they feel, then it may be promoted in "rank"). "Lyubov" has shown a high productivity under conditions of Belorussia. It gives an increase in yield of from 3 to 12 centners per hectare as compared with the standard, it contains 1.2-1.5 percent more protein, it does not become lodged, which is very important under the republic conditions, it is stable against root intergrowth, it does not shatter, and it possesses better baking and taste qualities.

In the control nursery of the Scientific-Research Institute on Agriculture, I was shown ten samples of vernal barley developed with the aid of the laser and exhibiting clearly promising indicators. New forms of oats are currently being tested. They will serve as the initial material for future strains which will meet modern requirements. Thus, even the physicists of the republic have been able, together with biologists, to make a contribution to the fulfillment of the USSR Food Supply Program. [Text] [Moscow PRAVDA in Russian 29 Mar 83 p 6] 12322

CSO: 1840/335

BIOCHEMISTRY

EFFECT OF CHROMOSOMAL MUTATIONS IN UVRA AND EXRA GENES AND PLASMIDS ON SURVIVABILITY OF E. COLI FOUND IN AIR

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 2, Feb 82 (manuscript received 19 Feb 81) pp 30-34

[Article by A. G. Skavronskaya, V. F. Konyukhov, L. Ya. Likhoded, S. M. Sadretdinov and O. A. Bogoslovskaya, Institute of Epidemiology and Microbiology imeni Gamaleya, USSR Academy of Medican Sciences, Moscow]

[Text] The reasons for the resistance and sensitivity of various types of bacteria to their presence in air are not yet determined, which makes difficult the prevention of some infections, the pathogenic agents of which were distributed by the air-droplet transport mechanism. The capability of cells to "heal" themselves of damage to DNA inflicted on them is one of the most important aspects in the recovery mechanism. This capability was first detected upon damage of the genetic structures of cells with ultraviolet rays and then by chemical agents [3]. Wabb [11] suggested that the reparative systems operating on recovery of UV damage also participate in restoration of the damage caused by aerosoling at medium and high relative humidity. No damage to DNA subject to restoration by UV-reparation systems was detected in our experiments upon aerosoling of *E. coli* under conditions of a climate chamber and relative humidity of 30 percent, when atmospheric oxygen has a strong lethal effect on cells simultaneously with dispersion and dehydration processes. Wabb's data [11] that wild strains survive better in air than strains defective with respect to UV-reparation were confirmed in these experiments. However, the identically marked increase of resistance to aerosoling in mutants for different reparative genes did not permit us to link the indicated resistance to DNA reparation. Under natural conditions, solar radiation has a strong lethal effect in daylight on microbial cells in the air, besides other factors. Thus, Harm [4] showed that *E. coli* B and *E. coli* K 12 AB 2480, defective with respect to UV-reparation, are very sensitive to sunlight and the damage received by them was intensively photoreactive under laboratory conditions.

These observations indicate that cells are damaged by sunlight mainly due to photoproducts occurring in the DNA, i.e., the same as occurs upon UV-radiation under laboratory conditions.

Some plasmids are able to change the UV-resistance of bacteria to irradiation, both reducing it and increasing it. It was shown that an increase of the resistance of bacteria to the effects of UV light in the presence of plasmids is not dependent on the state of uvr AB, rec BC, rec F, pol A and lig genes [9, 10].

Table 1. Strains Used in Experiment

Штамм (1)	Генотип (2)	УФ-чувствительность (3)	Кем получен (4)
E. coli K12 AB 1157	thr, leu, pro, his, arg, lac, gal, ara, xyl, mtl, tsx	Дикий (5)	Howard-Flanders
E. coli K12 AB 2494	thr, leu, pro, his, arg, lac, gal, ara, xyl, mtl, tsx, exr A	УФ S	Он же (6)
E. coli K12 AB 1886	thr, leu, pro, his, arg, lac, gal, ara, xyl, mtl, tsx, uvr A	УФ S	> >
E. coli K12 DM 842	lac — a — uvr A, exr A	УФ S	Mount
E. coli K12 GA ₉	trp	Дикий (5)	Алешкин (7)
E. coli K12 GA ₉ /pSA14	trp/amp ^R nor ^R str ^R	УФ S	Он же
E. coli K12 GA ₉ /pSA25	trp/amp ^R nor ^R str ^R Col E1	УФ S	> >
E. coli K12 GA ₉ /pSA50	trp/amp ^R nor ^R	УФ S	> >
E. coli K12 GA ₉ /pKM101	trp/amp ^R	УФ R	> >
E. coli A12 GA ₉ /col Ib	trp/col Ib	УФ R	> >

Key:

1. Strain
2. Genotype
3. UV-sensitivity

4. By whom obtained

5. Wild
6. Same person
7. Aleshkin

Many authors explain the effect of plasmids on the basis of their activation of the SOS reparation system or of individual phases of its work [6-8]. At the same time, study of the participation of plasmids in the mechanisms of UV-reparation made it possible to reveal a number of principles and to link plasmids to their participation in replication of the damaged chromosome.

We posed ourselves the problem of determining the degree of effect of UV-reparation systems on the survivability of E. coli cells, dispersed in air in the presence of scattered and direct sunlight, and the role of some plasmids in restoration of the survivability of cells under these conditions.

The E. coli cultures were grown in meat-peptone bouillon at 37° for 18 hours. The resulting suspension was centrifuged, rinsed and resuspended with distilled water to a concentration of $1 \cdot 10^9$ per milliliter. A bouillon culture of *Bacillus subtilis* var. *niger* was prepared by seeding on Gladstone-Fields agar with subsequent incubation at 37° for 5-6 days until total spore formation, which was checked under a microscope. The spores were rinsed with distilled water and heated for 30 min at 60°. Prior to the experiment, 0.2 ml of spores of *Bac. subtilis* var. *niger* was added in a concentration of $1 \cdot 10^9$.

per milliliter to 10 ml of a bacterial suspension of *E. coli*. The survivability of the *E. coli* strains prepared in this manner in a simulated aerosol state on microfilaments was determined as described earlier [2].

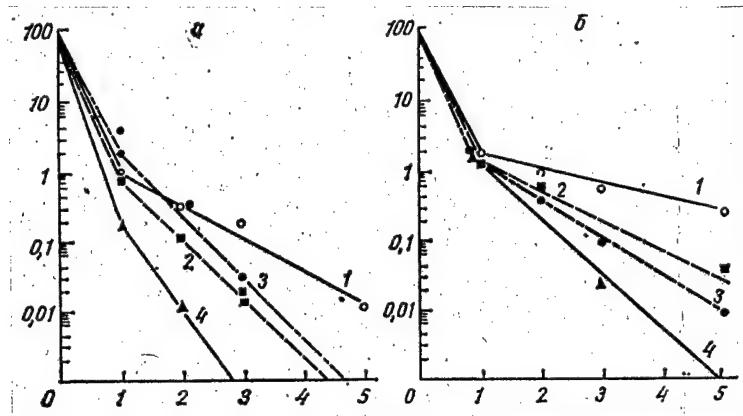


Figure 1. Survivability of *E. coli* K12 Strains, Defective with Respect to UV-Reparation Systems, in Air in Direct Sunlight (a) and in Scattered Sunlight (b): 1--strain AB1157; 2--AB2494 (exr); 3--AB1886 (uvr); 4--DM842 (exr, uvr); time (in minutes) is plotted along the x axis and survivability (in percent) is plotted along the y axis here and in Figure 2.

Results and discussion. Sunlight, by acting on bacterial cells dispersed in air, may damage their DNA the same as UV-radiation under experimental conditions. We suggested that the UV-reparation systems should play a significant role in the survivability of air-dispersed bacteria. To confirm this, we took strains defective in a number of genes that control the UV-reparation systems: strain AB1886 defective in the uvr A gene, i.e., incapable of accomplishing the first phase of excision reparation necessary to restore UV-damage, strain AB 2494, defection in the exr A gene, the product of which is important for different phases of reparation, and the double mutant DM 842, in which both of the indicated defective genes are combined. The control was strain AB 1157, which carries wild alleles of all reparative genes. Whereas the method of reparation is important for restoration of damage caused by sunlight, elimination of this path should result in a significant increase of sensitivity to sunlight. It is known that the mutation in the uvr A gene, which results in elimination of the capability of incision of the DNA strand in the damage zone, "encloses" the entire system of excision reparation of UV-damage. One would expect that uvr A mutants would be sharply sensitive to sunlight, to the effect of which they are subject in an aerosol. One would also expect increased sensitivity of bacteria in an aerosol exposed to sunlight in experiments with exr A mutants and in this case the sensitivity of exr A mutants should be lower than that of uvr A mutants. Based on experimental data on the presence of the total effects in uvr A and exr A mutants, one would also expect a total effect on the double mutant DM 842 under our experimental conditions as well. The experiments were conducted at 11:00 in direct sunlight when the total thermal radiation was $1.07 \text{ cal/cm}^2 \text{ per minute}$ and when the UV-rays with wavelength of 380 nm had output of 39 W/m^2 . The relative

atmospheric humidity was equal to 30-50 percent. Data on the survivability of the indicated strains in the aerosol in the presence of sunlight are presented in Figure 1. The double mutant was the most sensitive upon exposure to solar radiation and the wild strain was the least sensitive. Strains that carry the mutation in one of two genes (uvr A or exr A) had an intermediate level, approximately equal survivability. Thus, the death of bacteria that we observed followed the principles revealed during experimental UV-irradiation. The principle established in direct sunlight was also retained in scattered light, but the death of the cells decreased in proportion to the decrease of solar radiation intensity. (The total thermal radiation was $0.4-0.5 \text{ cal/cm}^2$ per minute, UV-rays with wavelength of 380 nm was $15-20 \text{ W/m}^2$ and the relative humidity was 40-60 percent in scattered light). Thus, the presence of UV-reparation systems is of considerable significance to the survivability of cells aerosoled during daylight, which is explained in reparation of UV-damage.

Some plasmids can alter the UV-resistance of the strain to irradiation, both reducing and increasing it. This gave us grounds to study the survivability of aerosoled strains which carry plasmids that alter the UV-resistance of bacteria. As can be seen from Table 1, all the strains tested in these experiments are isogenic derivatives of *E. coli* strain K 12 GA₉, to which different plasmids were transferred. The survivability of the strains carrying these plasmids, which were scattered in the environment in bright sunlight, is shown in Figure 2. The data found in experiments with plasmids that protect bacteria against UV radiation permit one to conclude that Col Ib and pKM 101 plasmids increase the survivability of bacteria in clear sunny weather. This phenomenon is regular since it was pointed out above that the given plasmids impart UV-resistance to bacterial cells and consequently should protect them against daylight UV-radiation. The survivability of isogenic strains that carry plasmids which impart UV-sensitivity to cells was studied in the next experiments.

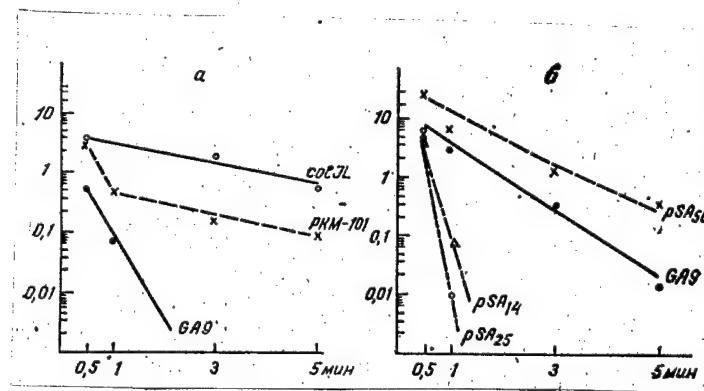


Figure 2. Survivability of *E. coli* Strains K12 in Air that Carry Plasmids that Impart UV-Resistance (a) and UV-Sensitivity (b)

We hypothesized earlier that variation of the UV-sensitivity of bacterial mutants, which we studied earlier, occurs due to the pleiotropic effect of the products of reparative genes, which can specifically be manifested in a change

of the cell membrane. The characteristic feature of plasmids that reduce UV-sensitivity consists in the fact that, along with sensitivity to UV light, they determine medicinal resistance, which is possibly related to variation of the structure of surface membranes [5]. As can be seen from Figure 2, strains that carry these plasmids (pSA₁₄ and pSA₂₅) show a considerably marked increased sensitivity to aerosoling in daylight, which corresponds to their sensitivity to UV-light. The behavior of the strain that carries the pSA₅₀ plasmid draws attention in Figure 2. This plasmid, like pSA₁₄ and pSA₂₅ plasmids, increases the sensitivity of bacteria to UV radiation. It has the opposite effect on aerosoled bacteria. The fact that pSA₅₀ plasmid, which imparts UV sensitivity to bacteria, provides considerable protection upon aerosoling of them in the presence of sunlight inspired us to check the effect of a number of available plasmids on the survivability of *E. coli* in air under chamber conditions. The results of these investigations are presented in Table 2.

Table 2. Survivability of *E. coli* Strains K12 GA₉ and Its Derivatives That Carry Different Plasmids (relative humidity 30 percent, 20°C and exposure time of 15 min) in Air

Штамм (1)	Выживаемость, % (2)	Число изм-рений (3)
GA ₉	1,4±0,3	26
GA ₉ /pKM101	2,1±0,2	30
GA ₉ /Col Ib	3,5±0,3	30
GA ₉ /R245	4,4±0,6	14
GA ₉ /pSA ₂₅	1,56±0,2	13
GA ₉ /pSA ₁₄	1,4±0,3	12
GA ₉ /pA ₅₀	11,0±1,4	34

Key:

1. Strain	3. Number of measurements
2. Survivability, percent	

As can be seen from Table 2, the presence of pKM101, R245 and col Ib plasmids in the cell has a very slight, although reproducible effect on the survivability of the strain in an aerosol; the survivability of bacteria containing these plasmids is increased no more than twofold compared to the survivability of isogenic strains that have no plasmids. The pSA₂₅ and pSA₁₄ plasmids that impart UV-sensitivity to bacteria (including GA₉ strain) in the absence of sunlight do not change the survivability of GA₉ in an aerosol. An exception is pSA₅₀ plasmid, which significantly increases resistance to aerosoling. Accordingly, pSA₅₀ plasmid increases the resistance of *E. coli* to aerosoling not only in sunlight, but in the absence of it as well. The reason for the indicated effect of the pSA₅₀ plasmid is not yet clear. This plasmid is a recombinant R col E I plasmid. It was produced in the laboratory of genetics of bacteria of the Institute imeni Gamaleya by hybridization of plasmids [1].

It was shown that the genome of the given plasmid contains two actively functioning plasmid replicators R-245 and col E I. It was also shown that the pSA₅₀ plasmid integrates with high frequency into the chromosome and is easily

disintegrated. It was mentioned above that the pSA₅₀ plasmid increases the UV-sensitivity of bacteria to the opposite effect with respect to aerosol bacteria. The following characteristics are also inherent to it: removal of the UV-induced mutability from the E. coli and an increase of spontaneous mutagenesis. The effect of this plasmid on the components of the cellular wall of the bacteria should apparently be analyzed to determine the mechanism of the effect of pSA₅₀ plasmid on the sensitivity of bacteria to aerosoling.

Investigations are now being conducted in this direction.

Conclusions

1. The survivability of bacteria in an aerosol state in sunlight depends on the state of uvr A and exr A genes.
2. The presence of Col Ib and pKM101 plasmids, that impart UV-resistance to bacteria, contributes to better survivability of the cells in air in sunlight, whereas pSA₁₄ and pSA₂₅ plasmids, which impart UV-sensitivity, accelerate the death of bacteria under these conditions.
3. The pSA₅₀ plasmid gives bacteria increased sensitivity to aerosoling both in the presence and in the absence of sunlight.

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UDC 612.6.02.017.1-063:578

MECHANISMS OF IN VIVO SUPPRESSING EFFECT OF FLAVI- AND BUNYAVIRUSES ON ACTIVITY OF EFFECTORS OF GRAFT VERSUS HOST REACTION

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 2, Feb 82 (manuscript received 21 Jun 81) pp 99-103

[Article by V. V. Khozinskiy and B. F. Semenov, Institute of Poliomyelitis and Viral Encephalitis, USSR Academy of Medical Sciences, Moscow]

[Text] Sufficient facts have now been accumulated that permit one to conclude that nonspecific modulation of the immunological reaction is an obligatory component of the pathogenesis of many, if not all, viral infections [1, 3]. However, the mechanism of this phenomenon has not yet been adequately studied, although the causative relationship between the change of the immune response to heterologous antigens in infected animals on the one hand, and the change in the function of both the immune-regulator cells, primarily of the T-suppressors, and of macrophages on the other, has been sufficiently clearly demonstrated in a series of communications from different laboratories [2, 4, 5, 7-9, 10].

We have now studied the characteristic features of modulation of the preliminary immunological identification of the allogenic and semiallogenic cells in the organism of mice infected by representatives of the Toga- and Bunyaviridae family.

Materials and methods. Langat (strain TP-21), dengue type 2 (strain No 23085) and yellow fever (strain 17D) or Tahyna (viscerotropic strain) viruses were cultivated in the brain of 2- and 3-day-old mice and were administered to the abdominal cavity of experimental animals at the rate of 10,000 LD₅₀/0.3 ml. The viruses were titrated on the suckling mice by infecting the brain with serial dilutions of brain suspension. Mice of lines BaLB/c, CBA, C57BL or first-generation hybrids (CBA X C57BL/F₁) weighing 18-20 g were obtained from the Solbovaya Nursery of the USSR Academy of Medical Sciences. Splenocytes, lymphocytes from the peripheral lymph nodes, thymocytes adhering to the plastic surface of the peritoneal exudate cell (KPE) or brain cells (KKM) were obtained by generally accepted methods [5]. The characteristics and conditions of treating the Thy-1,2 cells with antiserum (ATS) or polyvalent serum, immune to gamma-globulins (SPGG) of mice, are presented in a previous communication [5].

The local graft versus host reaction (RTPKh) under conditions of unilateral and bilateral incompatibility was used to evaluate cell immunity [11]. The recipients were administered $1-10^7$ cells under the skin of the right paw in 0.1 ml of medium No 199 in Hencks' solution. The reaction index was calculated with respect to the mass of the right and left popliteal lymph nodes. The activity of suppressors was evaluated in the recipients, to which a mixture of splenocytes of intact donors containing cells of infected mice were inoculated in the foot in the ratio of 1:1. The cells of infected mice were first treated with ATS or SPGG in some experiments. The index of the presence of suppressors was reduction of the RTPKh index, induced by the splenocytes of noninfected mice, upon administration of cells of infected donors to them compared to control animals that received only cells of intact animals. The results were statistically processed using Student's criterion.

Results and discussion. The first experiments show that all the investigated pathogenic agents had the capability of changing the preliminary identification of non-native antigens, but the conditions for manifestation of this type of activity was different in different viruses, when spleen cells were used as the effectors of RTPKh (Table 1).

Under conditions of bilateral incompatibility, the splenocytes of mice infected with Tahyna virus induced a weakly marked increase of popliteal lymph nodes compared to the control, when both intact and infected recipients were used as the recipients. The RTPKh was also suppressed upon administration of cells of the intact donor to the infected recipient (see Table 1, groups Nos 17 and 18, 19 and 20). The suppression effect was observed in experiments with the Langat virus only when working with infected donors and recipients. In the remaining combinations, the RTPKh index in the experimental group did not differ from the control values (see Table 1, groups Nos 1, 2, 3 and 4). Infection with yellow fever and dengue 2 viruses has no effect on the activity of spleen cells of CBA donors in the organism of BalB/c mice (see Table 1, groups Nos 13-16 and 9-12, respectively).

RTPKh suppression was observed in all cases in experiments with lymph node cells and thymocytes, when the donor was infected and remained intact in the recipient. Selection of the virus had no effect on the experimental results (see Table 1).

When CBA mice were used as donors and (CBA X C57BL) F₁ mice were used as recipients, a different effect of different viruses on development of local RTPKh after administration of nonsyngenic splenocytes was also determined (see Table 1). The suppression effect was observed in experiments with Tahyna virus upon infection of one or both partners (see Table 1, groups Nos 17 and 18, 19 and 20). When working with Langat, dengue 2 and yellow fever viruses, a compulsory condition for determination of nonspecific modulation was infection of the recipient (see Table 1, groups Nos 2, 4 and 1, 3; 10, 12 and 9, 11; 14, 16 and 13, 15, respectively). The splenocytes of infected CBA mice in intact hybrids behaved similar to the spleen cells of control animals.

Nonspecific suppressors, which have the capability of suppressing RTPKh caused by the splenocytes of noninfected mice (Table 2), appeared among the population of lymph node and thymus cells of animals infected with flaviviruses.

Table 1. Development of RTPKh Under Conditions of Unilateral and Bilateral Incompatibility on a Background of Experimental Bunya- and Flavi-virus Infections

№ группы (1)	Вирус (2)	Источник полу- чения эффекто- ров RTPKh* (3)	(4) Характеристика**		Индекс RTPKh у реципиентов*** (7)	
			доноров (CBA) (5)	реципиентов (6)	BALB/c	(CBA × C57BL) F ₁
1	Лангат (8)	Селезенка (9)	Н (15)	Н	2,7	4,0
2			Н	3	2,7	2,7
3			3 (16)	Н	2,6	3,8
4			3	3	1,5	1,6
5		ЛУ** (10)	Н	Н	2,8	—
6			3	Н	1,6	—
7		Тимус** (11)	Н	Н	1,8	—
8	(12)		3	Н	1,2	—
9	Денге типа 2	Селезенка	Н	Н	3,0	3,7
10			Н	3	3,1	2,6
11			3	Н	2,9	3,5
12	(13)		3	3	3,0	2,6
13	Желтой ли- хорадки	Селезенка	Н	Н	2,5	3,6
14			Н	3	2,4	2,5
15			3	Н	2,5	3,7
16			3	3	2,6	2,4
17	Тахина (14)	Селезенка	Н	Н	2,9	3,7
18			Н	3	1,6	2,1
19			3	Н	1,7	1,9
20			3	3	1,8	2,2

* The RTPKh effectors were obtained from donors on the seventh day of infection, the recipients were infected abdominally at the rate of 10,000 LD₅₀ by one of the above viruses and donor cells were administered to the right paw simultaneously in a dose of $1 \times 10^7 / 0.1 \text{ ml}$.

** N--noninfected donor or recipient; Z--infected donor or recipient.

*** The differences are statistically reliable ($P \leq 0.05$) between groups: in the bilateral incompatibility system (the donors were CBA mice and the recipients were BALB/c)--1, 2, 3 and 4; 5 and 6; 7 and 8; 17 and 18, 19, 20; in the unilateral incompatibility system (the donors were CBA mice and the recipients were (CBA × C57BL/F₁) mice--2, 3 and 2, 4; 2 and 4; 9, 11 and 10, 12; 13, 15 and 14, 16; 17 and 18, 19, 20.

*4 Similar results were found in investigations with lymph node or thymus cells of mice infected with dengue type 2, yellow fever or Tahyna viruses.

Note. The dash indicates experiments were not conducted.

Key:

- 1. Number of group
- 2. Virus
- 3. Source of obtaining RTPKh effectors
- 4. Characteristic
- 5. Of donors (CBA)
- 6. Of recipients
- 7. RTPKh index in recipients
- 8. Langat
- 9. Spleen
- 10. Lymph node
- 11. Thymus
- 12. Dengue type 2
- 13. Yellow fever
- 14. Tahyna
- 15. Noninfected
- 16. Infected

The reaction index after administration of a mixture of splenocytes of normal donors with an equal number of lymph node or thymus cells of infected mice to intact recipients was statistically lower than that in control animals (see Table 2, groups Nos 1, 4, 6 and 5, 7). This phenomenon was unrelated to the effect of the virus contained in infected effectors of RTPKh on the splenocytes of intact donors. In fact, administration of the splenocytes of control mice together with the investigated flavivirus in a dose from 100 to 1,000,000 LD₅₀ μ l in the paw of recipients was accompanied by development of RTPKh that did not differ in intensity from the indices in animals that received nonsyngenetic cells in combination with a brain suspension of uninfected mice or medium No 199 in Hencks' solution. No reduction of the reaction index was observed if the splenocytes of noninfected donors were administered to mixtures with LU lymphocytes or thymocytes of noninfected specimens. Splenocytes, KPE and KKM of both noninfected mice and mice infected with flaviviruses did not affect the development of RTPKh (see Table 2, groups Nos 1 and 2, 3; 1 and 8, 9; and 1 and 10, 11). Removal of LU cells that adhere to the plastic surface of elements from the population do not result in cancellation of RTPKh suppression by the lymphocytes of infected mice (see Table 2, groups Nos 1 and 17). All the immune-competent cells enumerated above, obtained from donors infected with Tahyna virus, did not cause a reduction of RTPKh intensity induced by the splenocytes of intact mice (see Table 2, groups Nos 1-11).

The suppressors occurring due to the influence of flaviviruses can be related to T-lymphocytes by a number of properties. As can be seen from Table 2, they are sensitive to ATS, are incapable of adhering to the plastic surface and are resistant to SPGG (groups Nos 1 and 2, 13, 14, 15, 16, 17).

We demonstrated that the suppressors induced in the lymph nodes by Langat virus suppressed the RTPKh only if the donors of these cells were syngenetic or semisyngenetic with respect to each other (see figure). Lymph node lymphocytes of infected CBA mice suppressed the reaction induced by splenocytes of intact donors of the same line or of (CBA X C57BL) F₁ line, but not C57BL mice. The suppressors of C57BL mice suppressed the activity of the splenocytes of (CBA X C57BL) F₁ donors, but not CBA donors, while the lymph node lymphocytes of (CBA X C57BL) hybrids suppressed the reaction induced by the splenocytes of parent lines.

It was shown in experiments with three flaviviruses and one Bunyavirus that they are all capable of suppressing the *in vivo* function of effectors of the RTPKh. However, the conditions of manifestation of the given function *in vivo* in different pathogenic agents were different. The data that we obtained permit one to assume that the modulating effect of the investigated viruses on the preliminary immunological recognition of nonsyngenetic cells is accomplished by several mechanisms. One of them is the effect of nonspecific suppressors. These regulatory cells were found in the lymph nodes and thymus of mice infected with Langat, dengue 2 or yellow fever (strain 17D) virus. These cells have been identified as T-lymphocytes in the combination of properties-- sensitivity to ATS, incapability of adhering to the plastic surface and resistance to the action of SPGG. One of the conditions for realizing the function of T-suppressors in some situations is the identity of the immunoregulator cells and cell-targets by the subloci of the N-2 gene complex. This

Table 2. Determination of T-Suppressors in Experimental Bunya- and Flavivirus Infections

(1) № группы	(2) Введенные клетки	Доноры клеток заражены вирусом (3)			
		(4) Лангат	(5) денге 2	(6) желтой лихорадки	Тахина (7)
1	СП ⁽⁸⁾	2,9**	3,1	3,1	3,0
2	СП + СП	3,3	3,4	3,5	3,4
3	СП + СП ₂	3,4	3,6	3,4	3,3
4	СП + ЛУ ₂ ⁽⁹⁾	3,5	3,4	3,6	3,5
5	СП + ЛУ ₃	1,8	1,6	1,9	3,1
6	СП + Т ₂ ⁽¹⁰⁾	3,1	3,3	3,4	3,2
7	СП + Т ₃	1,9	1,9	2,0	3,2
8	СП + КПЭ ⁽¹¹⁾	3,0	2,9	3,2	2,8
9	СП + КПЭ ₂	3,1	2,9	3,1	3,2
10	СП + ККМ ⁽¹²⁾	3,0	3,2	2,9	3,0
11	СП + ККМ ₂ ⁽¹³⁾	3,1	3,3	3,4	3,2
12	СП + (ЛУ ₂ + АТС)	2,7	2,8	2,8	—
13	СП + (ЛУ + КС) ⁽¹⁴⁾	1,7	1,6	1,8	—
14	СП + (ЛУ ₂ + СПГ)	1,8	1,9	1,9	—
15	СП + (Т ₂ + АТС)	2,8	2,7	2,9	—
16	СП + (Т ₃ + КС)	1,8	1,7	1,6	—
17	СП + КУ ₂ _{нп}	1,7	1,8	1,9	—

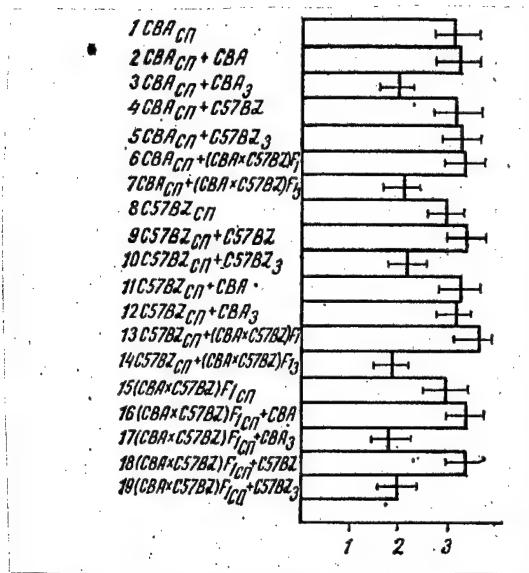
* A total of 1×10^7 splenocytes of uninfected CBA mice (SP) or SP mixed with an equal number of syngenic splenocytes (SP + SP), lymphocytes LU (SP + LU) or thymocytes (SP + T) that adhere to the plastic surface of the cells of the peritoneal exudate (SP + KPE) or nonadhering LU (np) brain cells (KKM) of mice uninfected or infected with a corresponding virus (SP, LU, T, KPE and KKM) was administered to the paw in noninfected recipients of the BALB/c line. ATS, KS and SPGG cells of LU or T were treated with anti-tet, control or serum against mice gamma-globulins prior to addition to the SP. Immune-competent cells were received from donors on the seventh day of infection.

** Values of RTPKh index. The differences are statistically reliable between the indices of groups Nos 1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 15 and 5, 7, 13, 14, 16, 17 ($P < 0.05$) with flavivirus infections. The RTPKh indices were identical in all groups with Tahyna infection.

Note. --investigations not conducted.

Key:

1. Number of group	8. Splenocytes
2. Administered cells	9. Lymph nodes
3. Cell donors were infected with virus	10. Thymocytes
4. Langat	11. Peritoneal exudate cells
5. Dengue 2	12. Brain cells
6. Yellow fever	13. Antiserum
7. Tahyna	14. Polyvalent serum immune against mice gamma globulins



Demonstration of Restriction of Activity of Nonspecific T-Suppressors in Allogenic System Upon Experimental Infection of Mice with Langat Virus: x axis--RTPKh index; y axis--administered cells; 1 X 10⁶ splenocytes of intact donors of the CBA, C57BL (CBA X C57BL) F₁ [CBA_{SP}, C57BL_{SP} (SBA X C57BL) F₁_{SP}] or a mixture of SP with an equal number of lymph node cells of noninfected donors [CBA, C57BL and so on] or infected donors [CBA₂, C57BL₂ and so on] obtained on the seventh day after infection were administered to the paw of noninfected recipients of BaLB/c line. The differences are statistically reliable between the values of the RTPKh indices in groups Nos 1, 2, 4, 5, 6, 8, 9, 11, 12, 13, 15, 16, 18 and 3, 7, 10, 14, 17, 19 ($P \leq 0.01$).

situation was demonstrated earlier when working with noninfectious antigens and oncogenic viruses [7] and recently when working with the pathogenic agent of tick-borne encephalitis [4]. The derived data permit one to assume that the rule of restriction of N-2 is also applicable to T-suppressors, activated in three other flavivirus infections. Thus, suppressors obtained from mice infected with Langat virus suppressed the activity of RTPKh effectors only if the latter were syngenic or semiallogenic, but were not allogenic with respect to them. The results of experiments with dengue 2 and yellow fever viruses permit one to assume a similar mechanism of interaction (suppressors--target cells) with these infections as well. The fact that inhibition of RTPKh induced by the splenocytes of noninfected donors in infected recipients occurred if the donors and recipients had common specific nature of the N-2 complex speaks in favor of this assumption.

As indicated during the course of the outline, special results were obtained during study of the effect of Tahyna virus on local RTPKh. It turned out that suppression of the activity of RTPKh effectors on a background of donor infection is unrelated to the activation of suppressors, similar to that in flavivirus infections. The cells of infected animals was characterized only by reduced activity in induction of RTPKh, but were incapable of suppressing the

reaction caused by splenocytes of control animals. One can now only assume that only the direct effect of the Tahyna virus on the RTPKh effectors occurs with the given infection or that other methodical procedures are required to determine the suppressors.

The mechanism of inhibition of RTPKh with Langat infection under conditions of bilateral incompatibility when both the donor and recipient are infected remains unclear. Suppressors or other factors of suppression to which the rule of N-2-restriction is not applicable, are apparently effective in this case. As is known, a viral infection is accompanied by modification of the antigen structure of the surface membranes of infected cells encoded mainly by the complex of histocompatibility [6]. One can theoretically assume that this change results in disruption of the immunological identification, as a result of which genetically foreign proteins will be identified as one's own. It is obvious that the derived data need further experimental investigation.

Conclusions

1. The capability of three flaviviruses and one Bunyavirus to suppress the activity of RTPKh effectors was demonstrated in in vivo experiments and it was shown that the conditions for modulation of preliminary immunological recognition are different upon infection with different viruses.
2. T-suppressors, which realize their own activity only with respect to syn-genetic or semisyngenetic targets, are activated upon experimental flavivirus infections.
3. No suppressor cells that suppress the activity of RTPKh effectors were detected in mice infected with Tahyna virus.

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CSO: 1840/302

UDC 615.339:578.245.4].015.46:612.017.1

IMMUNOMODULATING PROPERTIES OF INTERFERON

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 7, Jul 82 (manuscript received 24 Dec 81) pp 21-27

SPIVAK, N. Ya. and LISOVENKO, V. G., Institute of Microbiology and Virology imeni Zabolotnyy, UkrSSR Academy of Sciences, Kiev

[Abstract] This is a review type article covering Soviet literature up to 1981 and Western references to 1980. After some general introductory statements about interferon (IF), attention was shifted to the immune system, the role of helper cells, lymphocytes and macrophages in natural production of IF. Immuno-potentiating and immunodepressive activity of IF appears to depend on the experimental set-up; the reported data are not uniform. It is possible that IF inhibits humoral immune response by acting on cloning initiation or activation, but showing little effect on dividing B-cells in the developing clone. Recent data showed that type II IF exhibited strong immunomodulating effect, which appeared to be dose and exposure related. IF showed regulatory effect not only on humoral response but also on reactions of cellular immunity. Protection from development of neoplasms is exhibited by type II IF. Also, IF affected phagocytic activity of peritoneal macrophages and blood monocytes. The mechanisms of IF effect are complex and not yet quite understood.

References 50: 10 Russian, 40 Western.

[700-7813]

UDC 617-001.17-022.7-085.371:579.841.11

STUDY OF SAFETY, REACTIVITY AND EFFECTIVENESS OF PYOIMMUNOGEN IN IMMUNIZATION OF BURN PATIENTS

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 7 Jul 82 (manuscript received 30 Mar 81) pp 34-37

GRISHINA, I. A., PANOV, Yu. M., KOLKER, I. I., STANISLAVSKIY, Ye. S. and ZARUBINA, Ye. K., Institute of Surgery imeni Vishnevskiy, USSR Academy of Medical Sciences, Institute of Vaccines and Sera imeni Mechnikov, Moscow

[Abstract] A complex, multicomponent preparation--pyoimmunogen--was developed for the use in prophylaxis and treatment of *Pseudomonas aeruginosa* infections.

In the present paper experimental results were reported on treatment of 20 burn trauma volunteers with pyoimmunogen. The patients were immunized three times with an interval of 3-5 days, using a 0.5-1.0-1.0 dosage of the preparation. No postvaccination reactions or complications were noted. The preparation showed no pathologic effect on hemogram parameters or blood proteins; it did accelerate normalization of temperature. Clinically, it appeared to be a weak agent somewhat improving the general state of the patients and shortening their stay in the hospital. References 10: 3 Russian, 1 Czech, 6 Western. [700-7813]

UDC 616.98:579.841.93]-078.73

IMPORTANCE OF CROSSREACTIVITY IN EVALUATING SEROLOGIC DIAGNOSIS OF HUMAN BRUCELLOSIS. PART 2: EXAMINATION OF BRUCELLOSIS PATIENTS USING PASSIVE HEMAGGLUTINATION REACTION WITH HOMOLOGOUS AND HETEROLOGOUS ERYTHROCYTE DIAGNOSTIC REAGENTS

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 7 Jul 82 (manuscript received 28 Dec 81) pp 57-61

ZHELUDKOV, M. M., Institute of Epidemiology and Microbiology imeni Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Experimental results were reported on the use of passive hemagglutination reaction (PHAR) on brucellosis patients, using lipopolysaccharides isolated from brucellae and yersinia. In all, 343 sera were tested, divided in two groups: 73 specimens with a variety of somatic diseases (controls), and 270 patients with chronic brucellosis. Sera from brucellosis patients exhibited hemagglutins to homologous and heterologous antibodies. In the PHAR performed on these individuals, primarily 2-mercaptoethanol resistant antibodies (IgM) were observed to both antigens; the IgG antibodies were observed only during the exacerbation state. Overall, the results showed that this PHAR reaction could not be used as a differential or serologic diagnostic assay for brucellosis or yersiniasis. The crossreactivity in brucellosis patients was due to the presence of common antigenic determinants in lipopolysaccharide fractions of the cell wall of *Brucella abortus* and *Yersinia enterocolitica*. References 23: 18 Russian, 5 Western.

[700-7813]

UDC 615.371:[579.843.95+579.841.95+579.852.15].015.4:616.155.3-
008.9-092.18-07

CYTOCHEMICAL CHANGES IN PERIPHERAL BLOOD LEUCOCYTES OF GUINEA PIGS IMMUNIZED
AGAINST PLAGUE, TULAREMIA AND ANTHRAX

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 7,
Jul 82 (manuscript received 15 Jul 81) pp 73-76

SAFRONOVA, V. M., LOKTEV, N. A., BASILOVA, G. I. and PILIPENKO, V. G.,
Scientific Antiplague Research Institute of Caucasus and Transcaucasus,
Stavropol'

[Abstract] Enzymatic activity in guinea pigs' blood cells was studied at various stages of immunity development to plague, tularemia and anthrax. Single agent and triple combinations were used in vaccinating the animals subcutaneously. At the dose levels used, the vaccines had no side reactions and were effective immunologically. Analysis of experimental data showed a drop in the activity of acid phosphatase in the lymphocytes and a decreased number of total lymphocytes containing acid phosphatase. In neutrophil leucocytes a diminished activity of basic phosphatase and peroxidase was noted. At the same time, these vaccines led to increased activity of acid phosphatase and nonspecific esterases in neutrophil cytoplasm. At the dose level studied, it was impossible to determine whether the monovaccines were different from multiple preparations in respect to the enzymatic activity of leucocytes.

Figure 1; references 13: 10 Russian, 3 Western.

[700-7813]

UDC 616.98:579.841.93]-022.39-036.22(571.651)

OUTBREAK OF ACUTE BRUCELLOSIS IN REINDEER BREEDING TEAMS IN ONE STATE FARM
OF CHUKOTSK AUTONOMOUS OKRUG

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 7,
Jul 82 (manuscript received 24 Dec 81) pp 91-92

VOL'FSON, A. G., VDOVENKO, S. I. and AFANAS'YEVA, V. N., Institute of Biological Problems of the North, Far Eastern Scientific Center, USSR Academy of Sciences, Magadan

[Abstract] An outbreak of acute brucellosis was registered among the indigenous population in the northern regions--at the "Polyarnik" reindeer sovkhoz. The infection occurred most probably via the alimentary tract through consumption of milk and undercooked meat of deceased (not slaughtered) reindeer. Many of the northern aborigines showed primary latent form of brucellosis; when this state was coupled with other diseases lowering bodily resistance, the result was an outbreak of acute brucellosis. Clinical and laboratory findings were reported. Other means of patient infection were effectively discounted.

[700-7813]

BIOTECHNOLOGY

BRIEF

MICROBIOLOGY--The great effectiveness of the scientific research of the collective of the Microbiology Institute imeni Avgust Kirkhenstein of the LaSSR Academy of Sciences promotes rapid incorporation into production of completed research developments. This in turn increases the economic efficiency of such vitally important sectors of the national economy as poultry farming and the food and medical industries. In the three and a half decades of its existence, the institute's collective has made a significant contribution to the development of the newest directions of microbiology and has played an active role in solving complex national economic problems. State Prizes of the USSR and LaSSR, the first prize of the USSR Council of Ministers, medals at the VDNKh [Exhibition of USSR National Economic Achievements] and other awards testify to the recognition of the services of this scientific center. Latvian microbiologists are looking into the future. They are working on problems of utilizing industrial and agricultural wastes and obtaining protein from local raw materials and other preparations for livestock breeding.

[Text] [Riga SOVETSKAYA MOLODEZH in Russian 1 Feb 83 p 2] 9967

UDC 582.26+577.1

BIOCHEMICAL BASIS OF COMMERCIAL UTILIZATION OF ALGAE

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 19, No 1
Jan-Feb 82 (manuscript received 6 Jul 82) pp 3-10

MUZAFAROV, A. M. and TAUBAYEV, T. T., Institute of Microbiology, Uzbek SSR
Academy of Sciences, Tashkent

[Abstract] A review is provided of the biochemical and cultural characteristics of algae which render them suitable for commercial exploitation. In particular, analysis of algal composition has shown a high protein content (50-55%), the presence of at least 12 vitamins, considerable quantities of carbohydrates (30-35%), and lipids (14-20% or greater), while biochemical studies have revealed a very efficient photosynthetic apparatus. Chlorella and Scenedesmus have already found industrial use as sources of single cell protein and biostimulants in animal husbandry, silkworm breeding, and plant cultivation. References 30: 23 Russian, 7 Western.

[324-12172]

UDC 663.1

ADVANCES IN CONTINUOUS MICROBIAL CULTIVATION

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 19, No 1,
Jan-Feb 82 (manuscript received 24 Jun 82) pp 49-59

YAROVENKO, V. L., All-Union Correspondence Institute of the Food Industry,
Moscow

[Abstract] Advances in the continuous cultivation of microorganisms in the USSR and other countries are reviewed, especially in regard to continuous cultivation of the yeast *Saccharomyces cerevisiae* and the bacterium *Clostridium acetobutylicum* which are industrially important in the production of ethanol, acetone, and n-butanol. Preliminary investigations at pilot plants led to the extensive industrial use of the continuous cultivation technology, particularly at enterprises concerned with alcohol production, wine manufacture, beer brewing, yeast production, etc. The success in the implementation of the technology has largely been due to the fact that it is cost-effective. Figures 2; references 27: 22 Russian, 5 Western.

[324-12172]

APPLIED ASPECTS OF MEMBRANE BIOCHEMISTRY: A REVIEW

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 19, No 1,
Jan-Feb 82 (manuscript received 10 Jun 82) pp 60-77

OSTROVSKIY, D. N., KAPREL'YANTS, A. S. and LUKOYANOVA, M. A., Institute of
Biochemistry imeni A. N. Bakh, USSR Academy of Sciences, Moscow

[Abstract] A literature review is provided of the applied aspects of membrane
biochemistry in view of the key nature of biological membranes in many biological
phenomena. The three basic areas of applied research involve 1) products
derived from the membranes themselves, such as vitamin A, cytochrome c,
coenzyme Q, melanin, etc., 2) technological and medical applications, using
membrane models, e.g., bionic aspects, such as fuel cells that can transform
oxidation of organic substrates into electricity, design of catalysts to reduce
molecular nitrogen and produce hydrogen, liposomes or pharmacosomes for drugs
delivery, etc., and 3) modification of cellular and tissue function via alter-
ation of specific cellular receptors and other mechanisms. Bacterial membranes
have been found especially suitable as models in studies on anabiosis, cryo-
biology and cryobiochemistry, radiobiology and radioresistance. References:
192: 119 Russian, 73 Western.

[324-12172]

CONFERENCES

CONFERENCE ON MOTHER AND CHILD HEALTH

Moscow MOSKOVSKAYA PRAVDA in Russian 2 Feb 83 p 2

[Text] Yesterday in the Column Hall of the House of Unions, the Mosgorispolkom [Executive Committee of the Moscow City Soviet of Worker's Deputies], the MGSPS [Moscow City Soviet of Professional Unions], and the Main Administration for Public Health conducted a scientific-practical conference on the topic: "The actual problems of protecting the health of women and children".

Mosgorispolkom Deputy Chairman P. A. Voronina opened the conference. USSR Deputy Health Minister Ye. Ch. Novikova presented the opening report. Conference participants were secretaries of the CPSU Administrative Committee, chairman and secretaries of rayon soviet executive committees, chairmen and secretaries of party organizations, chairmen of professional union organizations, industrial enterprises, public health institutions, public and professional-technical education, scientific-research and educational medical institutes.

Participating in the work of the conference were R. F. Dement'yeva, secretary of the CPSU MGK [Moscow City Committee]; P. P. Shirinskiy, deputy director of the department of science and educational institutions, CPSU Central Committee; L. P. Lykova, deputy chairman of the RSFSR Soviet of Ministers; Academician N. N. Blokhin, president of the USSR Academy of Sciences, as well as responsible officials from the CPSU MGK and the Mossoviet executive committee.

12322
CSO: 1840/348

ECOLOGY

UDC 502.56:599.323.4

APPROACHES TO ECOLOGIC PREDICTION OF CONSEQUENCES OF INDUSTRIAL
CONTAMINATION OF GROUND ECOSYSTEMS BY HEAVY METALS

Sverdlovsk EKOLOGIYA in Russian No 5, Sep-Oct 82
(manuscript received 13 Jun 80) pp 65-71

BEZEL', V. S. Institute of Ecology of Plants and Animals, Urals Scientific
Center, USSR Academy of Sciences

[Abstract] The feasibility is considered of using mathematical models to predict the effect of heavy metals on laboratory animals in order to evaluate natural populations living in conditions of enhanced levels of these contaminants; the example used is the effect of mercury on *Microtus arvalis*. The following questions are examined: the ingress and distribution of heavy metals in ecosystems, including the topography of anthropogenic sources of pollution and the meteorologic and geographic and climatic conditions of a region; the ingress of heavy metals into the biological components of the ecosystem and the buildup of contaminants in particular elements of the ecosystem; qualitative evaluation of the effect of enhanced levels of a metal or individual populations in an ecosystem. Approaches to the problem are discussed. The mathematical model constructed makes it possible to simulate any conditions for the inhalation or oral ingress of mercury into the bodies of rodents and to obtain statistical distributions for concentrations of the metal in individual units of the model. It is concluded that toxicity experiments using the model make it possible to determine critical levels of the metal in animals. It is claimed that the model is adequate given the present level of knowledge.

Figures 2; references 18: 14 Russian, 4 Western.

[52-9642]

EFFECT OF AMMONIUM NITRATE IN FORESTRY FERTILIZERS ON CONTAMINATION OF WATER
IN FOREST STREAMS WITH NITROGEN COMPOUNDS

Sverdlovsk EKOLOGIYA in Russian No 5, Sep-Oct 82 (manuscript received 20 Jan 81)
pp 73-76

LEBEDEV, Ye. A. and POBEDOV, V. S. Belorussian Scientific Research Institute
of Forestry, Gomel'

[Abstract] A study was made of the possible connection between the use of mineral fertilizers in forests and contamination of forest streams. The test area was a 34.8 hectare tract of the Gomel' forestry establishment in the Kalininskiy forestry working through which a stream flows, entering the old bed of the Sozh River. The stream is about two meters wide and up to 1 meter deep. Ammonium nitrate was applied in doses of 100 kg per hectare in 70-year-old pine forest. Water samples were collected from six points located from 400 meters upstream to 60 meters downstream from the test site, 11 times over a period of 6 months. Ammonium nitrate in the dose indicated did not significantly affect the chemical composition of the stream water: slight increases in nitrates and nitrites were observed by the end of the experimental period, but the concentration of ammonia nitrogen was elevated in stream water only during the first two weeks following application of the fertilizer. Concentrations of ammonia nitrogen and nitrates at no time exceeded the maximum permissible concentrations. No increases were detected in the amounts of potassium, calcium, magnesium or hydrogen ions in the stream water. Figures 2; references 7: 4 Russian, 3 Western.

[52-9642]

EPIDEMIOLOGY

UDC 614.4:616-074

FUNDAMENTALS OF PERSONNEL AND ENVIRONMENTAL PROTECTION IN LABORATORIES HANDLING INFECTIOUS MATERIALS

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 12, Dec 82
(manuscript received 3 May 82) pp 42-44

VOTYAKOV, V. I. and BORTKEVICH, V. S., Belorussian Scientific Research
Institute of Epidemiology and Microbiology

[Abstract] A brief treatment is accorded to the principles of laboratory personnel protection and containment and disinfection of pathogenic agents, primarily viruses, in laboratories handling infectious materials. Essentially, the entire safety process rests on technological measures intended to provide for containment of the agent(s) (filters, hazard hoods, laminar flow rooms, buffer zones, etc.), their decontamination and inactivation, and prevention of direct contact with the personnel. Figures 1; references: 2 Western.
[262-12172]

UDC 616-092:612.57]-02:578.833.25

DENGUE FEVER

Moscow SOVETSKAYA MEDITSINA in Russian No 6, Jun 82
(manuscript received 4 May 81) pp 93-95

PAL'TSEVA, T. F. and NIKIFOROV, V. V., Chair of Infectious Diseases, Central Order of Lenin Institute for the Advanced Training of Physicians (TsOLIUV), Moscow

[Abstract] In order to familiarize and alert Soviet physicians to the possibility of dengue fever in the USSR, in view of the ever widening contacts between Soviet citizens and various tropical and subtropical areas abroad where dengue is endemic and a high incidence of dengue hemorrhagic fever prevails, three cases are presented which were seen recently in the infectious disease department of City Hospital imeni S. P. Botkin. One case involved a Cuban tourist, one a Soviet citizen returning from Havana, and the third an Armenian athlete returning from Jakarta after a boxing match. The clinical course of all three cases followed the classical dengue fever pattern with recovery, although the two Soviet citizens complained of sequelae at the time of discharge (myalgia). There have also been previous reports where Soviet athletes had contacted dengue fever in Jakarta. References: 2 Russian.
[256-12172]

GENETICS

UDC 575.1:576.851.5

RESTRICTION AND MODIFICATION SYSTEMS IN BACILLI RELATED TO BACILLUS SUBTILIS

Moscow GENETIKA in Russian Vol 19, No 1, Jan 82
(manuscript received 1 Dec 81) pp 33-38

KOZLOVSKIY, Yu. Ye. and PROZOROV, A. A., Institute of General Genetics,
USSR Academy of Sciences, Moscow

[Abstract] Modification and restriction systems were evaluated for 127 strains of bacilli isolated from the soil in Moscow and adjacent regions, which had been shown to be susceptible to various *Bacillus subtilis* bacteriophages. Six of the strains were found to possess restriction and modification systems differing from Bs_uR system of *Bacillus subtilis*, one strain possessed two different systems, and two strains possessed identical systems when tested with the phage φ105. DNA derived from all six strains was active in transforming competent *B. subtilis* 168 RUB83⁴ cells, and two of the six strains were found competent in transformation and transfection experiments. References 15: 2 Russian, 13 Western.

[299-12172]

UDC 575.24:575.851.48

CLONING BACILLUS SUBTILIS RIBOFLAVIN BIOSYNTHESIS OPERON GENES IN
ESCHERICHIA COLI VIA PLASMID pBR322 VECTOR

Moscow GENETIKA in Russian Vol 19, No 1, Jan 82
(manuscript received 23 Apr 82; in revised form 14 Jun 82) pp 174-176

PANINA, L. I. YOMANTAS, Yu. V., KHAYKINSON, M. Ya. and RABINOVICH, P. M.,
All-Union Scientific Research Institute of Genetics and Breeding of Industrial
Microorganisms, Moscow

[Abstract] The operon for riboflavin biosynthesis in wild type *Bacillus subtilis* and its constitutive operator variant were cloned in *Escherichia coli* cells by splicing *B. subtilis* DNA fragments, produced by digestion with R.EcoRI restrictase, into DNA segments derived from the plasmid pBR322 by the same restrictase and using the resultant DNA for *E. coli* transformation. The resultant hybrid plasmids were found effective in transforming Rib⁺ *E. coli*

and *B. subtilis* cells into the Rib^+ pheno-type. Furthermore, *E. coli* cells containing *B. subtilis* riboflavin genes produced low levels of riboflavin indicating low expressivity of the cloned operator and the fact that the operator for this operon does not control its expression in *E. coli*. The increase in the susceptibility to tetracycline of the transformed *E. coli* was ascribed to structural alterations in the *E. coli* genome since the inserted pBR322-rib plasmid is located in the promotor region of the tetracycline resistance gene. Figures 1; references 5: 4 Russian, 1 Western.

[299-12172]

UDC 577.1:547.963.3

CLONING AND EXPRESSION OF HEPATITIS B SURFACE ANTIGEN (HBsAg) GENE IN
ESCHERICHIA COLI

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 268, No 2, Jan 83
(manuscript received 22 Jul 82) pp 496-498

LUNIN, V. G., GOL'DBERG, Ye. Z., GRIGOR'YEV, V. G., MIKHAYLOV, M. M., KHUDYAKOV, Yu. Ye., SKRIPKIN, Ye. A., SMIRNOV, V. D., NARODITSKIY, B. S., KETILADZE, Ye. S. and TIKHONENKO, T. I., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] Molecular cloning experiments were carried out in which a BamHI-produced DNA segment, containing the HBsAg gene, was spliced into plasmid pLG1 for the transformation of *E. coli* cells. The transformed *E. coli* produced a 32 kilodalton polypeptide identified immunochemically as HBsAg. The yields of HBsAg were low (15-20 ng/ml), and indicate thereby the need for plasmid vectors whose expression in bacterial cells would yield high concentrations of HBsAg. Figures 2; references 9: 8 Russian, 1 Western.

[236-12172]

LASER EFFECTS

LASERS IN MEDICAL PRACTICE

Tbilisi ZARYA VOSTOKA in Russian 20 Feb 83 p 4

[Article by Nestan Alavidze: "The Healing Ray"]

[Text] Health Service

The laser is finding ever wider application in medical practice. At the republic's Ministry of Health Scientific Research Institute for Experimental and Clinical Therapy laser beams are being used to treat ulcers.

We walk along the white corridor to the operating room with the director of the endoscopic section, Candidate of Medical Sciences Petr Kantariya. The patient is already there, ready for the treatment session.

Using a special instrument, a fiber gastroscope, the doctor performs a gastroscopy (examination of the stomach), and at the same moment a laser beam passes along an optical fiber attached to a laser device and pierces the affected portion of the stomach. It acts for just a moment, a second, and the session is over.

"The laser beam stimulates rapid healing of the ulcer," explains Petr Makarovich. "Depending on the condition of the diseased area, two to five sessions are required, and the action of the beam, as you just saw, is very short." The effectiveness of the new method is shown by the fact that, whereas before an ulcer took one and a half to two months to heal, now this period has been shortened by half.

One of the directions which the application of laser light for medical purposes has taken is the stimulation of biologically active points, i.e. laser-puncture. The undoubted effect of this method has been shown in practice, in the treatment of diseases of the internal organs and neuralgic and joint diseases. Laserpuncture is a new method and, of course, physicians have taken it into their armamentarium as one of the promising reflex-therapeutic methods.

In addition to its biological action, the laser can be used as a means to stop bleeding of the gastrointestinal tract.

12344

CSO: 1840/347

MEDICAL DEMOGRAPHY

UDC 614.1:312(-201.4)

DEMOGRAPHIC SITUATION AND HEALTH CARE IN THE SUBURBAN REGION

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 7, Jul 82
(manuscript received 9 Feb 82) pp 44-45

[Article by B. L. Ginzburg, chief physician, Vitebskiy Rayon]

[Text] The data of the All-Union Census indicate substantial shifts in the demographic structure of the nation's population. These shifts are particularly distinct in suburban regions, from which the city complements its labor resources. It should be borne in mind here that not all those working in the city move there; many continue living in a rural area. The latter circumstance does not 'distort' the statistical structure of the suburban-region population, although the actual structure of the population involved with agriculture in the region differs from the statistical in other than the most favorable direction.

We attempted to analyze the demographic situation that has developed in Vitebskiy Rayon.

According to the data of the last census, the permanent rayon population comprises 53,800 people, 51,000 of which comprise the rural population.

The annual birth rate (mean data for five-year periods) has declined continuously since 1952-1956, while the overall mortality is rising.

It should be noted that the growth in the mortality parameter involves, primarily, people older than 60 years of age, while the mortality age parameters stabilized or declined in most of the younger age groups. This is especially apparent upon the exclusion of mortality due to accidents, the number of which is unfortunately increasing.

As a result of the indicated processes and of the mechanical mortality of the population, changes have occurred in the population's age-sex structure. The fraction of the population older than 60 years of age has increased, which is primarily explained by the reduced birth rate and, also, an absolute increase in people of elderly and advanced ages. The disproportion in the sex composition declined somewhat in spite of the continuing, marked predominance of women, associated both with the consequences of the war and, apparently, with the well-known longevity of women.

Primarily due to mechanized travel, the absolute number and fraction of women of 20-39 years of age declined markedly. This, in our view, reflected the attractiveness of a number of the female occupations generously provided by the city (stocking and knitted goods, sewing, rug-weaving, electro-technical production) combined with a rigidly normalized regimen of work and the possibility of free time for self-education and for enhancing one's cultural level. By contrast, in the village one sometimes encounters nonnormalized work, irregular leave presentation, less communal comfort. Also of apparent importance are the problems of the young family, which in the city has greater possibilities for sending children to preschool institutions and a greater access to medical care for mothers and children. One cannot, in our view, ignore the circumstance that materially well-provided parents continue living in the village and assist the establishment of many young families settling in the city. At the same time, such a pattern is not observed in a whole series of rayon farms (the state farms Selyuty and Rudakovo, the collective farms Krasnaya Armiya, imeni Kirova, Prizyv and others) where agricultural production is distinguished by a high standard and is combined with extensive residential and cultural and social construction.

How did the several parameters of the activity of the rayon's medical institutions change in recent years, and is there a connection here with the changes in demographic structure?

The boundaries of the rayon in 1967 were virtually the same as those today. For this reason, 1968 was specifically chosen for comparison. The number of visits to physicians per one inhabitant per year increased from 1.7 in 1967 to 5.2 in 1980, with a retention of the level of visits to middle medical personnel at independent receiving equal to 3.8-4.0 per one inhabitant per year (data are cited only for the rayon health-care system). This change in the parameter was undoubtedly influenced by the increase in the number of physician's posts (from 9.8 to 16.6 per 10,000 population). The number of visits increased by 3-fold with a 1.7-fold increase in physician's posts. We see several causes. These are the delivery of physician's out-patient care closer to the population, an increase in the intensity of physicians' work, the increased attention to prophylactic examinations, an enhanced visitation in connection with an expanded state insurance in the village, the reorganization of some collective farms into state farms, an overall increase in labor discipline and its approximation in the collective farms to the state-farm level, the growth in the wages (and accordingly disability allowances) of state-farm workers and collective farmers, the expansion of the right of mothers to receive allowances for children's care and so on. However, it is impossible to overlook also the increasing visitation in connection with the aging of the population. Elderly and advanced ages are, as is known, characterized by a number of chronic diseases. As a result of the decline in the resistance of the body in these people, certain acute pathological processes acquire a protracted course. The people of pension age, many of whom suffer from chronic diseases, continue to participate in socially-useful work, legally using the allowances offered them for temporary disability. According to sampling data, people of pension age accounted for up to 22% of the total number of visits.

The number of hospital beds increased from 60,000 per 10,000 population to 73,000 during the same period. The increase in the supply of beds with a decline in population numbers, the improvement of the prehospital preparation of patients, the introduction of expert evaluations of hospital work--none of this resulted, as would be expected, in a decline in the number of days of bed usage. On the contrary, it rose from 262.0 to 348.1 days per year, with an increase by 11.5% in the number of hospitalized patients. But at the same time, there was no decline in the mean duration of patient treatment in the hospital (12.9 days in 1970, 14.1 in 1975 and 15.7 in 1980). This can in some degree be explained by a certain reassignment of beds (decline in the number of maternity beds) and by an increase in the accessibility of hospital care. However, in our opinion the most important factor here is the rising demand for hospitalization by people of older ages; people older than 60 years of age comprised 48.9% of the total number hospitalized in rayon hospitals (the fraction of these persons comprised 38.9% in an analysis of the composition of patients in rayon hospitals conducted in 1976).

Comparing just these two parameters, we note the undoubted influence upon them of changes in the demographic situation. We can expect a continuing rise in the frequency of usage of out-patient and hospital care by persons of older age groups with their characteristic pathology. This circumstance raises a number of questions for the rayon health-care organs. We consider as justified the further development of the out-patient and polyclinic network with an expansion, in the out-patient clinic and at home, of the receiving of patients with cardiovascular, renal, neurological, endocrine and tumor pathology, with an increase in the volume of care for women of elderly age and an increase in the accessibility of dental prostheses. Apparently, there is a full-fledged need for a physician gerontologist in the rayon. Also in need of correction are questions of the hospital care of the population. It is useful to have departments of the basic profiles (two to three surgical and pediatric, two to three therapeutic, neurological and obstetric) in the larger hospitals (such as the Surazhskaya Village Hospital for 200-250 beds and the Babinichskaya Uchastok for 125-150 beds). Considering the proximity of the oblast center with its real promise for creating a powerful highly-specialized clinical base and with the pre-existing centralization of the psychiatric, phthisiologic, narcologic and dermatovenerologic care, the creation of analogous, but dwarf, specialized departments in the rayon would hardly be effective. In the remaining seven rayon hospitals, each with a capacity of 25-75 beds, it is suggested that special emphasis be placed on the transfer of patients from oblast hospitals for post-therapy and on the hospitalization of people of older age groups from the local population, concentrating in each of these hospitals patients of a particular profile. Naturally, such an orientation does not exclude the hospitalization of patients of a different profile, the necessary care of which can be provided in full volume in a divisional hospital.

Patients that primarily require nursing demand special attention. Leaving such patients at home makes it impossible for them to take the necessary therapeutic measures and frequently forces able family members to leave work for an extended time. Unfortunately, the organs of social security still do not have a base that might accept some of the aged citizens requiring nursing

as opposed to active treatment. We have managed a temporary and partial circumvention of this situation under the condition of Vitebskiy Rayon by utilizing small village uchastok hospitals, in the past having a low bed occupancy.

Finally, we consider it appropriate to reexamine the attitude of a post-hospital release from work. Life shows that a two- to three-day stay of a patient in a domestic environment after a hospital course of treatment is more effective than a stay of the same duration in the hospital, while treatment during this period is of a fortifying character and can be conducted entirely at the out-patient clinic. At the same time, every 100 patients thus released will permit the hospitalization of an additional 15-20 people requiring hospital treatment.

CONCLUSIONS

1. Changes in the demographic situation must be considered in planning the work of health-care organs and institutions.
2. Under the conditions of a rural rayon, simultaneously with the large multi-profile hospitals, the smaller uchastok hospitals are usefully retained, consolidating in them the hospitalization of persons of older age groups. In each of them, hospital care is usefully implemented in primarily a single type of pathology.
3. The further development of physician-out-patient care is necessary in village rayons, taking into account the pathology conditioned by changes in demographic parameters.

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9942
CSO: 1840/248

MEDICINE

UDC 591

REGULATION OF LUNG REGENERATION

Moscow ONTOGENEZ in Russian Vol 13, No 4, 1982 (manuscript received 11 May 81)
pp 387-394

BILICH, G. L., Mariyskiy State University, Yoshkar-Ola

[Abstract] Stimulation of compensatory hypertrophy in the lungs, increasing the maximum reaction volume using purine and pyrimidine derivatives and prevention of the transition from compensatory hypertrophic processes to scleroatropic were studied in white rats subjected to pneumonectomy. Postsurgery animals untreated with purines or pyrimidines exhibited scleroatropic processes, proliferation of collagen fibers, accumulation of lymphoid tissue, morphological decompensation of the emphysemic and sclerotic types, changes on the ultrastructural level, decreases in lung elasticity, increases in insoluble collagen content and disturbances in the balance between fibrillogenesis and breakdown causing excess parenchymal development. Administration of calcium orotate, methyluracil, inosine or riboxine prevented edema, accelerated regeneration and facilitated balance between stroma and parenchyma. Pneumosclerotic and emphysemic overgrowth were absent. Alveolar number increased. Changes in intraalveolar cell structure were diminished, while elastic properties were not. The development of effective compensation was enhanced, halving postoperative fatalities. This is reflected in early normalization of blood oxygen content, pH and buffer system performance. At 120 days after surgery, pulmonary volume was 40% higher than in intact animals similarly dosed with calcium orotate. Alveolar ventilation and minute volumes were increased. Isolated cases of respiratory alkalosis were seen, due to hyperventilation. Medicated rats had insoluble collagen levels intermediate between controls and intact animals. The data indicate that the purines and pyrimidines studied act as stimulators of lung regeneration on both the parenchyma-stroma and lymphoid tissue-lung tissue levels. References 14: 9 Russian, 5 Western.

[301-12126]

PRESENT PROBLEMS IN ACUTE CARDIAC INSUFFICIENCY IN CARDIOLOGY AND CARDIAC SURGERY

Moscow KARDIOLOGIYA in Russian Vol 22, No 10, Oct 82
(signed to press 22 Sep 82) pp 5-10

SOLOV'YEV, G. M., Moscow

[Abstract] Questions of the pathogenesis of acute cardiac insufficiency and ways of diagnosing and treating it are reviewed. The pathogenesis of acute cardiac insufficiency includes the following mechanisms: lowered cardiac contractility, arrhythmias, organic lesions, coronary disorders, elevated preloads and afterloads, and factors involving the internal medium. Microcirculatory disorders are now also distinguished as a very important element in blood circulation that can contribute to acute heart failure. Diagnostic methods are numerous. They include assessment of cardiac output, the inotropic status of the myocardium, and central venous pressure. Study methods include thermodilution studies, tetropolar rheography, fluorometry and isotropic studies; indirect biochemical methods are used extensively, although they have certain shortcomings. Computers are being increasingly used for diagnostic purposes as the complex of information available becomes more voluminous. Treatment of acute heart failure is comprehensive, in line with the complexity of pathogenesis, and includes regulation of preloads and afterloads, using various kinds of drug therapy and surgery, correcting arrhythmias, increasing cardiac contractility, and the use of adrenomimetics. Another method of treatment is to optimize the internal medium by correcting gas exchange, metabolic acidosis and polarization. Pacemakers also play an important role in treatment of acute heart failure, although the problem of using them to correct tachycardias remains unresolved. Experiments continue on development of an artificial heart. Meanwhile surgical methods are used extensively to replace heart valves, restore cardiac rhythms, and correct pulmonary edema, and in paroxysmal tachycardia and aortocoronary shunt in the preinfarction stage. Up-to-date equipment, including monitors, laboratories employing express methods, and surgical equipment for emergency operations, is essential in dealing with acute heart failure. Highly qualified specialists must be available and special training should be given for anesthesiologists, cardiologists and other involved in treating acute heart failure.

References 14: 11 Russian, 3 Western.

[270-9642]

DYNAMICS OF PSYCHOPHYSIOLOGICAL INDICATORS IN HEAT ACCLIMATIZATION

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR. SERIYA BIOLOGICHESKIKH NAUK in Russian No 3, May-Jun 82 (manuscript received 20 Jul 80) pp 59-63

SADIKOV, G. N. and AZANOVA, Ye. K., Institute of Arid Zone Physiology and Experimental Pathology, Turkmen SSR Academy of Sciences

[Abstract] An evaluation was made of physical training at elevated temperatures (50°C with 18-20% rel. humidity, 1 h/day with physical exertion equivalent to 100 Watts for 2 weeks) of 18-25 year old men on several psychophysiological parameters. The results demonstrated that the combination of an elevated thermal environment and graded physical activity lowered the completion times for simple and differentiating sensorimotor responses, enhanced the rate of information perception and processing (1.6 bits/sec before training, 3.1 bits/sec after), and stabilized fine motor coordination. These observations suggest that the combination of physical training in conjunction with high working temperature leads to more efficient utilization of physiological reserves. This may be especially pertinent in improving human performance in man-machine situations. Figures 3; references 16: 12 Russian, 4 Western.

[239-12172]

MICROBIOLOGY

UDC 631.46.53

EFFECT OF CERTAIN HEAVY METAL SALTS ON PHYSIOLOGICAL ACTIVITY IN CELLULOSE-DECOMPOSING MICROORGANISMS

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR. SERIYA BIOLOGICHESKIKH NAUK Vol 2, No 10, Aug 82 (manuscript received 26 Feb 81) pp 79-85

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[Abstract] A study was made of resistance to lead and cadmium in pigmented and colorless forms of cellulose-decomposing microorganisms (*Vibrio flavescent*, *Sporocytophaga myxococcoides*, *Sorangium composition* and *S. cellulosum*; the fungi *Alternaria tenuis*, *Cephalosporum acremonium*, *Myrothecium verrucaria* and *Acrostalagmus cinnabarinus*; and five species of *Actinomycetes*) with the aim of selecting indicator forms suitable for determination of pollution under natural conditions. It was found that the *Actinomycetes* were the most sensitive to Pb at high concentrations; they failed to develop at concentrations greater than 500 milligrams per liter, but even at low concentrations (50-500 milligrams per liter) their cellulose-decomposing activity was severely curtailed (1-6% of normal). No differences were found between pigmented and colorless forms. The bacteria and fungi studied showed varying degrees of resistance to lead; *Vibrio flavescent* and *Myrothecium verrucaria* were most resistant, showing a good capacity for detoxification. Most *Actinomycetes* died at Cd concentrations greater than 1.5 milligrams per liter. Cadmium was also bactericidal. Fungi remained resistant to Cd at concentrations up to 15 milligrams per liter. Pigmented microorganisms were generally more resistant to Cd than colorless forms. The findings indicate that cadmium is more toxic than lead in the cellulose-decomposing microorganisms studied. Further studies are needed to clarify the correlation between pigmentation and resistance to the effects of heavy metals. It is concluded that soil contamination with heavy metals leads to inhibition of the processes of cellulose breakdown under natural conditions. References 9: 8 Russian, 1 Western.
[53-9642]

THEORETICAL AND EXPERIMENTAL ANALYSIS OF SUBSTANCE TURNOVER IN A CLOSED MICROECOSYSTEM. PART 2. STEADY-STATE AND TURNOVER LIMIT FACTORS

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR. SERIYA BIOLOGICHESKIKH NAUK. Vypusk 2, No 10 (355), Aug 82
(manuscript received 28 Jun 80) pp 57-64

ABROSOV, N. S., GUBANOV, V. G. and KOVROV, B. G., Institute of Physics imeni L. V. Kirenskiy, Siberian Branch, USSR Academy of Sciences, Krasnoyarsk

[Abstract] Mathematical treatment is accorded to a homogenous closed micro-ecosystem involving autotrophic organisms which decompose dead organic matter to its elemental components. The rate of turnover depends on the intensity at both the synthesizing and reducing levels, with the assumption that gain in biomass is subject to limitation by one of the biogenic elements, carbon dioxide, or the availability of light energy, while the rate of decomposition is limited by the amount of the organic mass or the oxygen supply. Steady-state parameters can be calculated on the basis of availability of the biogenic substances in the system and the energy supply and, through the regulation of the limiting factors, the functional level of the closed ecosystem can be regulated. Figures 6; references: 6 Russian.

[233-12172]

PHARMACOLOGY AND TOXICOLOGY

UDC 576.851.214.093

SYNTHESIS OF CERTAIN EXOTOXINS BY β -HEMOLYTIC GROUP C STREPTOCOCCI GROWN ON LIQUID MEDIA

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 7, Jul 82
(manuscript received 7 May 81) pp 34-36

NIKANDROV, V. N., candidate of biological sciences, KUZINA, A. I. and DYMONT, T. A., Department of Biochemistry, Belorussian Scientific Research Institute of Epidemiology and Microbiology

[Abstract] β -Hemolytic group C streptococci were grown on several liquid media in order to correlate growth curves with the accumulation of streptolysins S and O and of nonspecific neutral proteases in relation to streptokinase production. Bacterial growth was generally completed in 14-16 h, while maximum streptokinase activity was detected 2-6 h earlier. Furthermore, streptokinase appears to be an extracellular enzyme since autolysis at the termination of growth was not accompanied by an increase in determinable streptokinase activity. No definable correlations existed between streptokinase synthesis and the formation of the various exotoxins. Consequently, highly-standardized and controlled conditions will have to be employed in the cultivation of streptococci for the production of streptokinase intended for clinical use in order to control and minimize contamination with exotoxins. Figures 4; references: 6 Russian.

[247-12172]

UDC 616.2-057-02:613.633:63(048.8)

OCCUPATIONAL DISEASES OF RESPIRATORY ORGANS CAUSED BY BASIC TYPES OF AGRICULTURAL DUST

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 6, Jun 82 pp 1-5

SENKEVICH, N. A. (Moscow) and VASIL'YEVA, O. S. (Saratov), Central Institute for the Advanced Training of Physicians; Scientific Research Institute of Rural Hygiene

[Abstract] This is a review type article. Many questions of the etiology, pathology, clinical aspects, nosologic forms and individual syndromes of bronchial and lung pathology caused by dust are unanswered to this day.

Agricultural dust consists of an organic-mineral mixture which varies, depending on the cultures involved, their treatment, type of soil and actual sites of operations. The principal active agent in a dust is located in the organic moiety. Dust particles often may carry various pathogenic micro-organisms. The following nosologic forms of lung disease have been noted in recent years: chronic bronchitis, bronchial asthma, grain fever, farmer's lung and pneumoconioses. Treatment of these diseases is basically symptomatic. References 36: 16 Russian, 20 Western.

[701-7813]

UDC 616-018.1-02;613.632;632.951

PESTICIDE EFFECT ON EXPLANTED CELLS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 6, Jun 82
(manuscript received 23 Mar 81) pp 21-24

VASILOS, A. F., SHROYT, I. G., DMITRIYENKO, V. D. and TODOROVA, Ye. A.,
Institute of Hygiene and Epidemiology, Kishinev

[Abstract] Results of morphologic, electron microscopic and cytochemical studies of the effect of pesticides on human embryonic fibroblast cells are reported along with aspects of comparative toxicity in vitro and in vivo. Following agents were tested: 2,4-dinitro-6-methylphenol, copper sulfate, sevin, metaphos, chlorophos, betonal, cineb, carbathione and tetramethylthiuram disulfide. The results showed that pesticides from different chemical groups differed in their effect on various structural and functional cell components and in their toxicity towards a given test object. The toxicity was always proportional to the dose and duration of the exposure. When the in vitro tests were compared with in vivo data, great variation was observed; actually there was no correlation to speak of between these two sets of data. It was concluded that cell cultures were inappropriate test objects for determining toxicity of pesticides towards higher animals. However, cell cultures could be used in modelling the toxic process to yield supplemental data on pathogenesis of intoxication. Figures 2; references 13: 10 Russian, 3 Western.

[701-7813]

PUBLIC HEALTH

UDC 362.11 + 616.4] (470.324)

HIGH QUALITY PUBLIC MEDICAL CARE AT VORONEZH OBLAST CLINICAL HOSPITAL

Moscow SOVETSKAYA MEDITSINA in Russian No 11, 1982 (supplement) pp 7-14

[Article by L.V. Yadykina, chief physician at the Voronezh Oblast Clinical Hospital]

[Text] The 11th Five-Year Plan marks a new stage in solving a broad range of social problems covering various aspects of the lives of Soviet people. Public health occupies a special place in the complex of tasks set.

Implementing the historic decisions of the 26th CPSU Congress, the CPSU Central Committee and USSR Council of Ministers decree "On Measures To Further Improve Public Health" (1977), and the decisions of the 13th AUCCTU Congress, medical workers in Voronezh Oblast, with the active participation and constant care of the party and soviet organs, are taking stronger measures to raise the oblast health service to a new level.

In recent years positive shifts have been noted in the most important indicators for public health (decreased incidence of disease with shorter periods of work incapacity among workers at sovkhozes and kolkhozes, reduced mortality and incapacity resulting from myocardial infarction). The material base for the public health establishments has been significantly improved.

In solving the questions facing public health in Voronezh Oblast, a crucial role is played by the oblast clinical hospital, which is the center of therapeutic and diagnostic and specialized medical care, organizational-methodological leadership for treatment-and-prophylactic establishments, and improvements in the qualifications of medical personnel and the training and scientific base of the medical institute.

The hospital now has 1,990 beds located in 38 clinical departments, a consulting polyclinic capable of handling 800 patients per shift, a gynecologic consulting department handling 300 patients per shift, and a 150-place rest home [pansionat]. More than 30,000 patients are treated at the hospital each year.

Some 2,600 people work at the hospital; there are about 500 physicians and more than 1,000 middle-echelon medical workers.

Work is organized in close cooperation with the scientists at the medical institute, and 10 clinical faculties operate on the base of the hospital.

A central service has been set up to deploy personnel more rationally and make use of medical apparatus and equipment: a single surgical department has been created, consisting of 32 surgical suites with 53 working places where more than 1,000 complex operations are performed each month; a laboratory-diagnostic department has been set up consisting of 11 laboratories where up to 370 different study procedures are performed. This has made it possible to staff the departments with qualified personnel, acquire up-to-date equipment and provide more effective management. Conditions have been created for the extensive introduction of scientific achievements, improved labor productivity, shorter times for patient studies and the more rational utilization of beds.

A centralized sterilization section operates at the hospital. Each day the section handles more than 5,000 syringes, 10,000 needles and other medical instruments and materials. As a result, the chances of the occurrence of serum hepatitis are being eliminated, nursing sisters are freed for patient care, and the danger of allergic diseases in personnel is excluded.

The new forms and methods of the country's best establishments and the schools of leading experience in Moscow, Leningrad, Riga, Rostov and so forth are being constantly introduced.

Using the experience of the Gor'kiy Oblast Hospital we have set up an X-ray and radiologic center with centralized X-ray (28 rooms), radiologic and endoscopic services with X-ray procedure rooms.

On the basis of the department of functional diagnostics, where increasingly complex electrophysiological methods are being employed, a remote-control EKG transmission center is operating, with communications with all the central rayon hospitals.

Equipping departments and services with up-to-date equipment and apparatus makes it possible to introduce extensively complex study methods such as cardiac catheterization, coronary arteriography and ultrasound cardiography, which make it possible not only to study anatomical features and cardiac contractility but also to examine the morphology and function of individual cardiac structures.

During the 10th Five-Year Plan more than 300 modern diagnostic methods were introduced in the hospital departments. Among these, methods for the diagnosis of cardiovascular diseases have been used extensively: transseptal intracardiac studies, tetrpolar rheography, cineangiography with video recordings. The volume of such studies is increasing each year: in 1977 some 6,883 studies were done, in 1981 12,050. This is making it possible to introduce new treatment methods also: the "dry heart" operation in congenital defects using artificial circulation apparatus, plastic operations on the renal arteries, surgery of the pancreas, suprarenals, aorta and major vessels. Comprehensive treatment is provided for patients in terminal conditions in endotoxic and exotoxic shock using hemosorption, hyperbaric oxygenation and artificial

circulation. Use of this complex of treatment makes it possible to more than halve mortality in this category of patients.

The activity of the neurosurgery and neurotraumatology departments is being expanded. New surgical methods are being used here: early surgical intervention with reliable internal stabilization of the spinal column with subsequent early training in walking, and the rapid use of prostheses; this is making it possible to reduce the time that patients spend in the hospital and offers an opportunity for early rehabilitation. Various kinds of microsurgical techniques have been introduced for hearing-improvement operations.

Some 42 specialties are handled in the consulting polyclinic, and conditions have been created for maximum investigation of patients before hospitalization, which positively affects the indicators for the operation of the hospital. This can be graphically seen from the figures in the table below.

Table 1. Duration of Mean Preoperation Bed-days, by Nosologic Units

Disease	Mean bed-days before surgery	
	1976	1981
Gastric and duodenal ulcer	11.2	8.2
Hernia	4.1	1.1
Pararectal fistula	18.1	3.0
Leiomyoma uteri	9.4	4.8

One form of work making it possible to improve the quality of patient studies and patient treatment has been the creation of scientific-practical specialized centers that combine the hospital department, profile of the faculty and the polyclinic examination rooms. These centers are headed mainly by scientists from the medical institute or by department chiefs. A total of 21 oblast and 3 interoblast centers have been set up. Their organization makes it possible to study working conditions and the reasons for the development of a number of diseases, and to carry out more effective dispensary observation.

Much organizational and therapeutic-prophylactic work is being done by the oblast rheumatology center. There are rheumatologists in more than half of the rayons. As a result of the complex of measures initiated by the center, primary incidence of rheumatism declined from 0.04 per 1,000 in 1978 to 0.01 per 1,000 in 1981. The percentage of recurrences decreased from 6.4 in 1978 to 4.5 in 1981. Compared with 1978, temporary work incapacity resulting from rheumatism was cut by 1.3 days in 1981. Patients with rheumatoid arthritis are being actively detected and treated.

Since 1979 the staff of the oblast cardiology center has been studying the spread of ischemic heart disease and hypertension among the rural populations in two rayons. During this period more than 5,000 individuals have been studied (examination, filling out of questionnaires, measurement of arterial pressure). Data have been machine processed and the recommendations obtained are being studied by the staff at the center and passed on to patients.

An interoblast medical genetics center has been set up at the oblast hospital for the purpose of early detection and prevention of hereditary pathologies in the Central Chernozem zone. The center has studied about 3,500 patients with various diseases covering 96 nosologic forms. These data are used for diagnosis and prophylaxis and for a more substantiated prognosis concerning offspring.

Definite successes have been achieved in providing medical care for patients with cardiovascular diseases. A comprehensive approach is made to this problem and it is being resolved jointly with the faculties of the medical institute.

The creation of highly specialized centers with a high concentration of qualified personnel and special equipment has made it possible to reduce mortality in extensive myocardial infarction to 11.6 percent, while the average duration of hospitalization has been cut to 35.1 bed-days. Patients are sent to the local cardiology sanatorium imeni M. Gor'kiy for rehabilitation. Close links are maintained with the staff there and consultations take place on patient management tactics and treatment. This stage-by-stage treatment has made it possible for 78.9 percent of patients with extensive myocardial infarcts and 93 percent with minor infarctions to return to work; patients with acute myocardial dystrophy return to work 5 months after the onset.

Much work has been done in the oblast to develop specialized medical care for the rural population. To this end, 39 rayon and 11 inter-rayon departments have been set up. Each department is handled by a department chief at the oblast hospital and a scientist from the medical institute. On this basis permanent seminars, out-of-town meetings of scientific-practical societies, hospital councils and inter-rayon conferences are held. All this is promoting the introduction of modern examination and treatment methods. Specialized services make up 80 percent of the work in these departments, and the average annual use of beds is 320 days.

Many years of working experience at the oblast hospital have convincingly shown that solving the problems of consistently improving the effectiveness and quality of medical care is inconceivable without comprehensive introduction of measures concerned with the scientific organization of labor in the activities of therapeutic-prophylactic establishments and the work of their staffs. This kind of comprehensive introduction of measures concerned with the scientific organization of labor has also been effected at the hospital.

In order to insure coordination and the proper interaction of departments and services at the hospital, an operations section has been set up to provide internal and external hospital consultations, monitor timely completion of medical documentation, effect centralized dispatch of lists of those temporarily incapable of work, organize a data retrieval system and operate the ambulance service, hospital offices and typing bureau, and carry out a dispatcher function for the engineering-technical service. Time taken to provide consultation documentation has been reduced. Whereas in 1980 (when the operations section was set up) consultation statements were made available in 30 percent of cases, by the end of 1981 the figure was 70 percent.

The automated control system section and the computer laboratory for medical cybernetics at the oblast hospital are continuing their work and gaining experience. For a number of years mathematical methods have been used to optimize treatment, diagnosis and prognosis of diseases of the internal organs. The automated control system section is now engaged in automated detection of cardiovascular pathologies in mass examinations in particular occupations (the screening system), and it is solving the problem of classifying and predicting the functional status of various systems in patients' bodies.

In the CPSU Central Committee and USSR Council of Ministers decree "On Measures To Further Improve Public Health" much attention is devoted to questions of organizing proper diets for the population. Therapeutic diets constitute an important component in the comprehensive treatment and rehabilitation of patients. A public catering hall directly subordinated to the oblast administration for public catering has been organized in order to improve therapeutic diets for patients and to organize diets for the staff. The 5 years of experience in organizing therapeutic diets in a major general hospital using a specialized service testify to the progressive and promising nature of this method. Given this kind of organization for therapeutic diets, hospital supplies of the full range of foodstuffs is improved and the staff catering question is solved positively. This all makes it possible to prepare therapeutic dishes taking into account the requirements of the therapeutic cuisine (at least 17-20 different therapeutic diets) and provides an opportunity for dieticians and nurses in charge of diets to better monitor the quality of products and the preparation of therapeutic dishes: moreover, it becomes possible to solve the question of normal and therapeutic diets for the staff at the hospital.

The collective of the oblast clinical hospital is doing much organizational-methodological and consultative work. Each year hospital specialists make 700 to 800 trips to the oblast rayons, while scientists at the medical institute make about 100 trips. During the trips about 20,000 consultations take place and more than 200 operations are performed, and new diagnostic and treatment methods are introduced.

The work of the "Zdorov'ye" trailer unit has been positively appraised. The trailer, staffed by specialists from the oblast hospital and other specialized medical establishments in the oblast, travels to remote regions during the period of mass agricultural work and is set up right there where the inhabitants live--among the field detachments, tractor teams and livestock-raising complexes.

Out-of-town outpatient departments and polyclinics have been organized at all the central rayon hospitals.

The organization of out-of-town forms of medical care has increased the numbers of rural inhabitants seeking consultations with physicians. Whereas in 1976 the number of visits to physicians was 4.1 per inhabitant and consultations with middle-echelon medical personnel 6.3 per inhabitant, in 1981 the figures were 5.0 and 4.1 respectively.

Much work is being done to improve the qualifications of medical staffs in the oblast. A good material-technical base and the availability of a rest

home [pansionat] in which 50 working places have been allocated for probationers, have made it possible to increase the number of physicians and middle-echelon medical personnel sent on internship and information and specialization courses. Each year, at the local base alone up to 600 physicians improve their qualifications by means of 1- to 4-month rotations in 32 specialties. Each year a month-long course is held on the organization of public health and social hygiene, with the active participation of the faculty of public health administration. All the chiefs of the central rayon and city hospitals and polyclinics providing primary health care attend these courses, along with advanced training at the central bases. In addition, a permanent seminar on public health administration is in operation.

Much attention is given to the training of middle-echelon medical personnel. In addition to the courses in 21 specialties held each year and attended by more than 500 individuals, intermittent full-time and part-time courses are held for physician's assistants working at medical points, chief and senior nursing sisters, and midwives. In all, each year more than 1,000 middle-echelon medical personnel improve their qualifications or acquire a specialty.

In addition to course training, each year the organizational-methodological department, jointly with the main oblast specialists, plans, organizes and holds 9 or 10 oblast and interoblast congresses and conferences, 9 inter-rayon conferences with seminars, more than 130 oblast seminars, and 10 to 12 seminars on the basis of the oblast schools of leading experience; more than 10,000 medical workers attend these events.

The work being done is promoting improvements in the quality of medical care.

The creation of a major hospital base has made it possible to successfully resolve questions of specialized beds and the rational utilization of available beds and expensive medical equipment, and also to make efficient use of the labor of highly qualified medical personnel.

Much attention is given to work with the hospital staff and a plan for the social development of the collective has been drawn up and is being successfully implemented.

A medical health point has been organized for the hospital workers on the basis of the polyclinic. A catering hall, beauty shop and store are functioning. In recent years 150 families of the hospital workers have obtained new, well-appointed apartments. A hostel with places for 540 persons has been built at the hospital.

The hospital has repeatedly been awarded diplomas of the USSR Ministry of Health, confirmed as a participant in the All-Union Exhibition of National Economic Achievements and gained a Diploma First Class and two bronze medals of the exhibition, and since 1977 has held the challenge Red Banner of the trade union obispolkom and oblast council, the oblast health section and the medical workers trade union obkom.

For its 1981 results the collective at the hospital gained a high award: it was awarded a challenge Red Banner of the CPSU Central Committee and USSR Council of Ministers.

The level of work achieved is not the limit on our possibilities. Considerable untapped reserves are available. It is necessary to improve management forms, increase efficiency in the utilization of material and labor resources, and set up departments for restorative therapy and rehabilitation.

The efforts of the collective are now being directed toward raising the level of therapeutic-diagnostic work and the quality of the medical care offered. This is our contribution to fulfilling the decisions of the 26th CPSU Congress.

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CSO: 1840/260

STATUS OF PUBLIC HEALTH IN MOLDAVIA

Kishinev ZDRAVOOKHRANENIYE in Russian No 5, Sep-Oct 82 pp 3-5

[Article by N. I. Dolgiy, Deputy Public Health Minister of the Moldavian SSR:
"Public Health in Moldavia on the 60th Anniversary of the USSR"]

[Text] Together with the fraternal family of peoples in our country Soviet Moldavia is moving toward an important date--the 60th anniversary of the USSR. During the years of Soviet power the republic has made significant progress in the areas of the national economy, economics and culture. Modern cities, revitalized villages, highly developed industry, agriculture and culture and the constantly improving standard of living of the population are the results of the implementation of national Leninist policies.

A bright confirmation of party policy directed at improving the well-being of the Soviet people were the decisions of the 26th Congress of the CPSU, the 15th Congress of the Moldavian CP, the May 1982 Plenum of the CPSU Central Committee and the Foodstuffs Program passed there.

In addition to other branches of the national economy public health in the republic is developing at a rapid pace.

During the years of the 10th Five-Year Plan alone over 76 million rubles of capital investments were assimilated for the development of the material base of public health. Under construction are hospitals with a total capacity of 3,926 beds and clinics handling 12,355 visits per shift. Put into operation are large multi-profile hospitals, clinics, sanitation-epidemiology stations, including the Republic Clinical Hospital with 1,000 beds, the maternity house in Kishinev with 250 beds, the maternity house of the Moldavian SSR Ministry of Health with 300 beds, a polyclinic in the city of Bendery with a capacity of 1,200 visits per shift as well as a number of treatment centers and large clinics in other cities and rayons of the republic.

In 1981 over 15 million rubles were assimilated and the treatment center in the central rayon hospital of the settlement of Ryshkany with 180 beds, the Tiraspol'skiy Maternity House with 250 beds, the treatment complex of the central rayon hospital of the settlement of Teleneshty with 120 beds, a polyclinic in the city of Bel'tsy with a capacity of 900 visits per shift, a stomatological polyclinic in the city of Kishinev, a polyclinic in the Kishinev City

Dispensary with a capacity of 400 visits per shift, and a dispensary in the city of Bel'tsy with 300 beds were put into operation.

During the years of the 10th Five-Year Plan kolkhozes, sovkhozes and industrial enterprises spent over 11.4 million rubles for the building of medical facilities. These resources were used to build hospitals with 1,355 beds and polyclinics and outpatient departments for 250 visits per shift. In 1981 3 million rubles were utilized for these purposes and hospitals with 235 beds and polyclinics with 990 visits per shift were put into operation. In 1981 the number of hospitals increased threefold over the number existing in 1940; the number of beds in them increased by a factor of 7.8 and the number of pharmacies doubled.

In 1981 there were over 13,000 physicians working in the republic, and about 40,000 intermediate medical workers. Of great significance to the development of public health and the training of medical cadres was the opening in 1945 of the Kishinev State Medical Institute, which during the years of operation trained over 12,000 specialists. At the present time over 5,000 students study in its five departments.

Each year about 1,000 specialists increase their knowledge in the faculty for the advanced training of physicians, which was created by the institute in 1962. Seven paramedical schools provide specialized training for over 2,500 students. In 1981 alone 3,093 physicians received certification, including 631 in the highest category, 1,636 in the first and 826 in the second. Also certified were 5,718 intermediate medical workers.

A large detachment of doctors and candidates of medical sciences are working successfully in the republic in the Kishinev State Medical Institute and three scientific-research institutes.

Medical scientists are working on problems concerning the prevention, early diagnosis and treatment of various diseases, the improvement in the environment, and so forth. All of this research is of great practical significance and it is constantly being introduced into the activities of treatment-prophylactic facilities.

During the years of Soviet power and especially during the last five-year plans the system of outpatient clinics has developed intensively in Moldavia. Today the modern polyclinic is a treatment-diagnostic center where the patient is comprehensively assessed and receives effective treatment.

In 1981 there were 34.8 million physician visits. At the present time specialized outpatient department polyclinic services provide care in 46 clinical specialties; polyclinics of central rayon hospitals--in 27 specialties.

Extensive work has been done to fulfill the decisions of the party and state to develop uchastok services. In the republic 649 therapeutic and 542 pediatric uchastoks have been opened. The average number of residents per single therapeutic and pediatric territorial uchastok is close to the norm.

Preventative care is being implemented systematically and purposefully in the republic. In 1981 48.3 percent of the population was encompassed in all types of examination. The level of dispensary care comprised 189.0 per 1,000 residents for adults and 127.0 for children.

The republic is implementing purposeful work to improve inpatient services to the population. Comprehensive measures are being realized to develop specialized forms of inpatient services, of which there are 35 different types in the republic, including 18 in central rayon hospitals. Measures are being taken to strengthen the material base of central rayon hospitals. In 1981 their average capacity reached 353 beds. The hospitalization level of individuals reached 22.0 per 100 persons, including 21.8 among urban residents and 22.2 among rural residents.

A convergence of the levels of inpatient services to urban and rural residents is being facilitated by the continued development of the material base of central rayon hospitals, by the supplying to them with highly qualified cadres and modern medical equipment and technology. In order to more effectively utilize the bed fund of rural areas it is essential to improve continuity of care between the central rayon and rural uchastok hospitals and to utilize the beds of rural uchastok hospitals as affiliates of the departments of central rayon hospitals.

An improvement in the organization of emergency aid is continuing. The network and capacities of emergency aid departments in central rayon hospitals are growing. In 1981 over 700,000 republic residents utilized emergency services.

The network of pharmacies in the republic has grown. At the present time there are fewer than 10,000 persons per pharmacy.

The fulfillment of socio-economic goals and implementation of medical measures has enabled us to significantly improve the health status of women and children. The physical development of children of all age groups has improved and the incidence of illness among women has decreased.

A great deal has been done, but the organs and institutions of public health in the republic have new goals for the 11th Five-Year Plan, as presented in "Basic Directions for the Economic and Social Development of the USSR in 1981-1985 and in the Period to 1990," and in the resolutions of the CPSU Central Committee and the USSR Council of Ministers, "On Measures to Further Improve National Public Health," and "On Supplementary Measures to Improve the Health Protection of the Population." "We must do everything possible to make sure that the Soviet citizen receives modern, professional and immediate medical aid everywhere and at any time," noted L. I. Brezhnev at the 26th CPSU Congress.

Moving toward the anniversary of our country, the organs of public health and the medical profession in the republic have significantly activated work to further improve conditions of work and the standard of living for Soviet people, to develop in them the elements of a healthy life style. It is

important to determine the optimal volume and increase the quality and effectiveness of preventative, periodical and special-purpose prophylactic examinations and dispensary care for the population, and to strengthen the effectiveness of state sanitation monitoring over the fulfillment of measures to protect the environment.

The development of the republic's national economy via agroindustrial integration, cooperation and specialization dictates the necessity of comprehensively studying the health of workers in agroindustrial associations and of providing a scientific basis for the forms and methods of organized medical services to them.

Continued improvement in specialized forms of medical aid has been foreseen in the creation of specialized departments in hospitals and offices in polyclinics, specialized brigades of medical services, in the expansion of sanitation rehabilitation aspect of treatment for the ill and in the development of rehabilitative therapy departments.

While further strengthening the material-technical base of public health we should strive toward the proportional development of all types of medical facilities. Special attention must be given to the building of rural outpatient physician-manned departments and medical points in the village. The strengthening of the material base of public health must be coordinated with the modernization of existing facilities, with the practical introduction into public health of NOT [Scientific organization of labor] elements, with new methods of diagnosis and treatment. It is essential to continue work to improve continuity of care in the operation of outpatient-polyclinics and inpatient facilities, emergency services and clinics and to further improve the operational organization of pediatric and midwives-gynecological facilities.

The fulfillment of tasks that are now before the public health system of the republic is inseparably tied to improving the quality of training of medical and pharmaceutical cadres in accordance with scientifically-based needs for them, with the efficient distribution and use of specialists.

Public health workers will devote all of their knowledge and experience to fulfilling the historical decisions of the 26th CPSU Congress and the November 1981 and May 1982 plenums of the CPSU Central Committee and will greet the 60th anniversary of the USSR with dignity.

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CSO: 1840/277

UDC 614.2(47+57)

SOVIET GOVERNMENT AND PUBLIC HEALTH

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 12, Dec 82
(manuscript received 14 Oct 82) pp 3-9

[Article by RSFSR Minister of Health V. V. Trofimov]

[Text] Sixty years ago, on 30 December 1922 an historic event occurred--the First All-Union Soviet Congress proclaimed the formation of the Union of Soviet Socialist Republics--a voluntary association of the Soviet republics into a union government.

The entire history of the USSR is evidence of the creativity of the ideas of proletarian internationalism and is the fruitful results of the Leninist national policies of the Communist Party. The formation of the Soviet Union was one of the decisive factors providing favorable conditions for the reorganization of society on socialist bases, for elevating the economy and culture of all union republics and strengthening the defensive power and international interests of the multinational workers' government.

The Soviet socialist government of workers and peasants was the first in the world to take upon itself the complete responsibility for protecting the health of the population, introducing free medical care for the entire population. The main principle of the national health care became the principle of prophylaxis. V. I. Lenin, who gave considerable attention to health care and the development of Soviet health, proceeded from the fact that economic growth creates the prerequisites for strengthening the workers' health and disease prophylaxis. In imparting major importance to the maintenance of the health of the population and preventing the development of the economic causes of diseases, V. I. Lenin at the same time stressed that a large role in disease prevention is played by strictly medical measures.¹ A broad network of medical institutions, sanatoria, rest homes and physical-culture complexes and a vigorous medical industry were created in the nation during the years of Soviet power.

1. B. M. Potulov, V. I. Lenin i okhrana zdorov'ya sovetskogo naroda [V. I. Lenin and Health Care of the Soviet People], 3d ed., Meditsina, Moscow, 1969, pp 147-148.

There had been no experience in constructing a truly national health-care system. The search for the most rational forms of medical-care organization at first encountered considerable difficulties, both because of the limitation of the network of therapeutic institutions, disrupted and declining during the years of World War I, and due to the lack of medical cadres.

However, from the very start, Soviet health care always actively participated in the solution of socioeconomic tasks confronting the government, being engaged in the medical care of people working in the main divisions of socialist construction. The performance of a complex of social and medical measures promoted an improvement in the health of the nation, many infectious diseases were liquidated and life-span was increased. Population mortality was very high in pre-Revolutionary Russia. Half of those born died before the age of 15 years; only 28.3% of the population lived to 45 years and 13.5% to 60. The average life-span comprised 32 years.

During the past 60 years life-span increased to 70 years. The increase in average life-spans was undoubtedly an important factor contributing to the scientific-technical progress in which we now pride ourselves. For, surely, in order for a person to be able to realize his potentials: to learn, obtain an education and profession, to work and to return with interest the expenditures and to augment the social wealth, he needs time.

The successes in the struggle for the maintenance and prolongation of human life are dependent not only upon the expansion of the network of medical institutions and a growth in the numbers of cadres or the introduction of the achievements of science and technology. They are primarily determined by the extent to which special prophylactic and therapeutic measures are combined with the socioeconomic measures of the government, providing for a high level of life of the people. Industry and agriculture are developing at rapid rates in the USSR, working and living conditions are improving, residential construction is conducted on an unprecedented scale, conditions are being created for the rapid progress of science and the growth of the population's cultural level and the social-security system is being improved.

The prophylactic direction has become the basis of the organizational forms and methods of operation of health-care organs and institutions. A most important method of prevention is the prophylactic dispensary service, permitting timely detection of the early forms of disease and the implementation of the appropriate therapy, as well as the realization of measures for improving the working and living conditions of the people under prophylactic dispensary observation.

Prophylactic work is promoted by the broad sanitary-hygiene education of the population, which is conducted by medical workers of all institutions in cooperation with mass social organizations. A wide network of health universities and schools has been created in recent years, where anyone interested can attend lecture courses on various questions in hygiene and medicine.

The solution of many problems in health care and melioration is possible only with the help of the population. The involvement of broad workers' strata in the activity of health-care organs and institutions is realized in our nation following V. I. Lenin's initiative from the first days of Soviet power.

The most mass-scale social organizations are the Red Cross and Red Crescent societies, which number more than 50 million members.

On the eve of the 60th anniversary of the formation of the USSR, it can be stated with complete assurance that the main principle of Soviet health care--the provision of a free, widely-accessible and qualified medical care to the entire population--has been realized.

The provision of political equality to the formerly-suppressed nationalities and national minorities has laid a firm foundation for socialist health care in the autonomous republics and oblasts of the RSFSR. As is known, under Czarism the population of the national frontiers had nearly no medical care, and the morbidity and mortality there were higher than among the remaining population of Russia.

The Soviet regime was confronted not only with the task of organizing the medical care of the inhabitants of the fraternal republics but also overcoming their ancient prejudices. The socioeconomic and medical measures carried out by the Soviet government made it possible to attain in a short period a sharp improvement in the living conditions and an enhancement of the cultural level of the population of the autonomous republics and oblasts, to raise the level of their sanitary state and medical service.

The daily interest of the government in developing industry and agriculture in the autonomous republics and oblasts, in enhancing culture and material well-being and in developing health care made it possible to improve considerably the state of the population's health. The autonomous republics have achieved a level equal to the remaining regions of the Russian Federation with respect to the development of the network of medical institutions and the quality of training of the medical cadres. At the same time, the rates of growth of medical institutions and cadres in these republics considerably exceeded those in the Russian Federation as a whole.

In the Russian Federation, the characteristics of the republic's vast territory--the diversity of climatic and natural conditions, the presence of inaccessible mountainous and forested regions, the multinational population and demographic processes--were taken into account in solving the problems of organizing the population's medical care, in developing a network of therapeutic-prophylactic and sanitary-hygienic institutions and in opening new medical institutes and medical secondary schools.

In the RSFSR, the republic's health care was confronted by the task of organizing a socialist health care in the national autonomous republics and oblasts in accordance with the Leninist national policy; moreover, the outstanding growth of the health-care network and cadres was maintained in the newly developing regions, primarily in the industrial regions of the Urals, Siberia and the Far East and Extreme North.

At the present time, guided by the decisions of the 25th and 26th party congresses, the CPSU Central Committee plenums and L. I. Brezhnev's instructions on means for further improving the health care of the Soviet people and

eliminating deficiencies in the work of therapeutic-prophylactic institutions and individual medical workers, the RSFSR Ministry of Health and local health-care organs have directed their efforts at fulfilling the tasks stipulated by the CPSU Central Committee and USSR Council of Ministers resolution "Measures for the Further Improvement of National Health Care" (1977).

The RSFSR Ministry of Health concentrated on developing and implementing comprehensive measures for prophylaxis and reducing population morbidity, improving the organization of the work of health-care institutions, enhancing the culture of their workers, strengthening measures for women and child health care, expanding specialized medical care, broadly introducing into medical practice scientific and technical achievements and advanced experience in the scientific organization of labor, improving professional training and the ideological-political education of the medical cadres and developing the health-care material-technical base.

During the years of the 9th through 10th and the start of the 11th Five-Year Plans there were constructed and brought into operation large multiprofile and specialized hospitals for 600-1,000 beds and, further, modern polyclinics for 750-1,200 visits per shift, model maternity homes, children's hospitals and other health-care objects. At the start of 1982, 1,829,696 beds were available in the republic's health-care institutions. The provision of the population with hospital beds increased to 125.3 beds per 10,000 population and to 130.8 beds, taking into account the network of other departments. The problem of training physician cadres and middle medical personnel has been for the most part successfully solved in the Russian Federation. The graduation of physicians and pharmaceutical chemists increased from 23,154 persons in 1975 to 24,825 persons in 1981. At the present time, 579,900 physicians work in the RSFSR in the institutions of all departments. The parameter of the supply of physician cadres rose from 34.8 per 10,000 population in 1975 to 41.4 in 1981 with respect to all departments.

The highest supply of the population with physicians (not counting Moscow and Leningrad) was attained in Arkhangelsk Oblast with 59.2 physicians per 10,000 population, in the North Osetian ASSR with 57.8 physicians, in Kamchatka Oblast with 53.4 physicians, in Magadan Oblast with 50.4 physicians, in Sakhalin Oblast with 46.9 physicians, in Murmansk Oblast with 48.4 physicians and in Khabarovsk Kray with 45.7 physicians. During the years of the 10th Five-Year Plan, considerable attention was given to the staffing with physicians of polyclinic institutions, emergency medical-care stations and especially the uchastok service. In the cities, 12 administrative territories achieved full staffing of therapeutic divisions with physicians; shop divisions were fully staffed with physicians in 28 territories and pediatric divisions in 23 territories. The number of physicians sent to work in rural areas increased from 5,500 persons in 1975 to 6,800 in 1981, which made it possible to reduce the number of village uchastok hospitals and out-patient clinics unstaffed with physicians. The parameter of supply of the population with middle medical workers increased from 104.4 per 10,000 population in 1975 to 115.4 in 1981. Considerable work has been done to improve the activity of the primary health-care components: the polyclinics, emergency medical-care institutions, village uchastok hospitals, out-patient clinics and feldsher-midwife points.

In the interests of raising the level of supervision by health-care organs and institutions and of developing the prophylactic direction, the RSFSR Ministry of Health devoted considerable attention in recent years to introducing and improving new organizational forms of work.

An important positive result of the development of the republic's health care is universal practical introduction of the experience of the joint work of health-care organs, medical VUZ's and scientific research institutes. Such cooperation made it possible, in the framework of comprehensive plans, to solve the problems of elevating the quality of medical care and developing its specialized forms both in the city and in the village and to prepare qualified medical cadres.

The achievements of medical science, modern methods and means for prophylaxis, diagnosis and therapy and new progressive forms of work for therapeutic-prophylactic institutions have been more widely introduced into health-care practice.

The RSFSR Ministry of Health for a number of years has, jointly with economic-sector trade-union Central Committees and with ministries and departments, conducted an organizational work directed at improving the working conditions and reducing the overall and occupational morbidity of workers in industry, construction, in transport and in agriculture.

Cooperation in the work of the health-care, education, trade, agriculture and social-security ministries and the Committee for Physical Culture and Sport was strengthened considerably for health care and improvement of the educational conditions for children in preschool institutions and school.

Public reports on supervisors were initiated in most therapeutic-prophylactic institutions in the interests of increasing publicity and the responsibility of medical workers for the quality and standard of medical care, for the performance of their professional and official duty and, also, in the interests of combatting an inattentive and callous attitude to patients.

In the Report of the CPSU Central Committee to the 26th Party Congress, CPSU Central Committee General Secretary and Chairman of the Presidium of the USSR Supreme Soviet L. I. Brezhnev said "Under the conditions of the 1980s special significance is acquired by a careful, economic attitude to labor resources. This is a complex matter, demanding the solution of many problems of an economic, technical, social and educational character." Hence the most important tasks of the health-care organs for the 11th Five-Year Plan and in the future is the adoption of measures for the prophylaxis and for the improvement of methods for diagnosing and treating such wide-spread ailments as diseases of the cardiovascular system and organs of respiration, oncologic diseases, child diseases, gynecological and extragenital diseases in women and, also, the prophylaxis of traumatism. This will promote the solution of a number of problems in medical demography.

The special importance of these tasks is related to the fact that in the early 1970s the population began to differ in many demographic characteristics from what it was one to two decades earlier. A decline in birth rate and a change

in the structure of the generations, urbanization and the redistribution of the population between the city and village, an annually-increasing migration, the aging of the population and of its work-capable portion, changes in the ratio of newborns from first and succeeding births and change in the ratio between the numbers of men and women in various age groups--all these demographic shifts influence the state of the population's health. Morbidity, mortality and life-span appreciably impact on the dynamics of the demographic processes and on the working activity of the population. Their state is the result of the aggregate, complex influence of various conditions and factors, the control of which must be implemented not only by the health-care sector but by many other economy sector ministries, departments and organizations in cooperation with health care. Therefore, today as never before, great significance is acquired by the improvement of working conditions, the protection of the external environment and the elevation of the quality of prophylactic work.

A program of scientific research planned jointly with the Siberian Department of the USSR Academy of Medical Sciences will play an important role in the solution of medical problems of demography.

At the present time, investigations in the Russian Federation in the field of health care and medicine are conducted by groups in 76 scientific research and 41 medical VUZ's and 18 problem scientific-research laboratories. Working in them are 2,013 doctors of sciences and 12,372 candidates of sciences. All of the republic's scientific institutions complete about 2,000 planned investigations annually. About 1,500 proposals have been developed from the results of the investigations for introduction into the practical work of therapeutic-prophylactic institutions and 300 proposals for introduction into institutions of various industrial branches of the national economy. A system of measures has been implemented for perfecting the forms and methods for planning scientific investigations and for improving the organization of the practical introduction of the achievements of medical science.

The basic scientific profile of the higher medical educational institutions has been defined. For the most part during the 10th Five-Year Plan, comprehensive investigations were performed and long-term special-purpose programs prepared for scientific research studies. The basic and applied scientific research work performed in the Russian Federation has become more productive in recent years.

Scientists will make a substantial contribution to the problem of combatting cardiovascular diseases, which are the most frequent cause of invalidism and temporary work incapacity. Basic research has been conducted on the neuro-humoral regulation of cardiac activity, the mechanisms of adaptation of the cardiovascular system and the microcirculatory bed and the biochemistry and pathomorphology of atherosclerosis. Practical methods have been developed and introduced for the remote diagnosis of myocardial infarction, contrast methods for the study of vessels and so on.

New tasks confront the republic's health care in connection with the decisions of the May (1982) Plenum of the CPSU Central Committee, at which the Food Program was adopted. Health care has been called upon to contribute its

share to the program's realization. The RSFSR Ministry of Health in accordance with the resolution of the RSFSR government on the further improvement of the medical service in RSFSR collective and state farms has developed a plan that stipulates the following: opening in all rayons (where this has not already been done) of emergency medical-care stations (departments) integrated into the central rayon hospitals and, in certain rayons, into their branches in large rayon and divisional hospitals;

--further development of a network of attached therapeutic and pediatric uchastoks for service in polyclinics (central rayon hospitals) of the population living near rayon centers;

--creation in central, rayon, kray, oblast and republic (ASSR) hospitals and dispensaries of supplemental mobile out-patient clinics, stomatological, dental-prosthetic and fluorographic clinics, women's consultation clinics, clinical-diagnostic laboratories and other mobile institutions serving the collective farmers, state-farm workers and particularly the inhabitants of remote and unpopulated sites, including during the time of mass-scale agricultural work;

--opening of rayon and interrayon specialized departments, primarily cardiologic, pulmonary, gastroenterologic, tramatologic and oncologic;

--organization in 1983-1985 of children's departments in all central rayon hospitals;

--equipping of emergency medical-care stations (departments) of central rayon hospitals and of ambulances with radios and telephones by the end of 1985 in all uchastok hospitals and out-patient clinics and, also, no less than 60% of the feldsher-midwife points;

--significant expansion of the prophylactic examinations of village inhabitants, elevation of the quality of these examinations and qualified treatment of all patients detected, including in urban specialized medical institutions; moreover, immediate attention must be given to the early detection and treatment of cardiovascular diseases, nonspecific diseases of the respiratory organs, tuberculosis, oncologic diseases and alcoholism;

--establishment of constant supervision on the part of oblast, kray and republic (ASSR) committees of the medical workers' trade union for the creation in rural areas of the necessary working and living conditions for medical workers and the workers' provision with the privileges stipulated by the appropriate decisions of the party and government;

--elevation of the quality and expansion of the volume of methodological and practical assistance to central rayon hospitals, rayon and uchastok hospitals, out-patient clinics and feldsher-midwife points providing medical care to the collective farmers and state-farm workers; preferential provision of specialized treatment to collective farmers and state-farm workers in departments of a hospital (prophylactic dispensary) and in the consultative polyclinic;

--development by rayon chief physicians, medical-VUZ rectors and scientific-research institute directors of a plan for training qualified cadres for newly-created rayon and interrayon specialized departments;

--establishment of constant supervision of the fulfillment at collective farms, state farms and at other agricultural enterprises of plans for comprehensive measures for improving the conditions and protection of labor, especially women's, conducting sanitary-hygienic work, reducing manual, heavy physical labor, increasing the mechanization of labor-intensive processes in agricultural production and, the strict observance of rules for safety techniques;

--increasing the rigor of the state sanitary supervision of working and social conditions at agricultural establishments and objects and, also, the supervision of the planning and building of rural settlements and animal-raising and other complexes, the water supply, sewage and services and utilities;

--authorization of the opening of animal-breeding and other productional objects only on condition of the completion of work for the construction of a full complex of the appropriate cleaning facilities.

Significant, crucial tasks confront health-care workers of the rural region in connection with the implementation of the Food Program, since the protection and strengthening of the health of agricultural workers is their professional duty.

In the report at the CPSU Central Committee May (1982) Plenum, L. I. Brezhnev said: "For our constructive plans to be realized we must preserve peace. Therefore, we will maintain at the requisite level the nation's defensive capacity, we will persistently and purposefully struggle for the relaxation of international tension, both political and military relaxation. But we also well understand another condition for the fulfillment of our plans, an important prerequisite for the preservation of the cause of peace. The labor of the Soviet people is the most reliable basis for strengthening the power and prosperity of our Mother Land."

Considering the further improvement of the population's health care as one of the most important social tasks posed by the 26th Party Congress, the RSFSR Ministry of Health jointly with local party and soviet organs continues working for the fulfillment of tasks stipulated by the CPSU Central Committee and the USSR Soviet of Ministers resolution "Measures for the Further Improvement of National Health Care".

A new manifestation of the socialist government's concern for the health of the Soviet people was the resolution adopted in August 1982 "Additional Measures for the Improvement of the Health Care of the Population", in which the need was stressed for a further intensification of disease prophylaxis, accident prevention, environmental melioration, the improvement of working, social and rest conditions and the instillment in the Soviet people of a conscious attitude towards the preservation and strengthening of health.

The health-care organs, in implementing measures for disease prophylaxis, the reduction of morbidity with temporary loss of work capacity and the prevention and reduction of invalidism on the basis of the achievements of medical science and practice, promote the acceleration of scientific-technical progress, the elevation of labor productivity and the further growth of the economy of our nation.

At all stages of the development of Soviet health care, considerable attention was always given to work with cadres, the correct placement, education and rational utilization.

The Soviet physician, armed with the Marxist-Leninist world-view, must be an internationalist, a person of high enthusiasm, a bearer of advanced views and a fighter against foreign ideology and against the manifestations of bourgeoisie morality, religious superstitions and the rudiments of the past in the consciousness and behavior of people. In this is one of the most important conditions for the fulfillment by medical cadres of their professional duty.

In the year of the 60th anniversary of the formation of the USSR the medical workers of the Russian Federation can state that they possess all conditions for the successful realization of the tasks presented health care by the Communist Party. Basing themselves on the achievements of the economy and culture of the Nation of Soviets and on the social policies conducted by the party and government in the interests of the people, the republic's health-care workers are improving disease prophylaxis and treatment and the care of the people's health, they are developing the specialization of medical care as a means for improving its quality, they are attaining an increase in the level of health care for rural residents and its approximation to the level of the medical care for the urban population, they are expanding and improving dispensary treatment, struggling for the universal melioration of working and living conditions and the environment and developing effective forms of organization for hospital and out-patient and polyclinical care and the scientific organization of labor--they are doing everything to strengthen the health of the people and to increase their longevity.

Closely rallied around the national party and its Leninist Central Committee, our people will confidently build the road to the future, to new victories of communist construction.

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STATUS OF PUBLIC HEALTH IN BELORUSSIA

Minsk KOMMUNIST BELORUSSII in Russian No 12, Dec 82 pp 70-76

[Article by D. Belyatskiy, professor, and A. Kosach, docent: "In the Name of Health for the Individual"]

[Text] In our country concern for the health of man has become a truly national affair. Moreover, it has been elevated to the rank of a constitutional norm, which is reflected in the USSR Fundamental Law.

A new, bright manifestation of this concern is the recently-passed resolution of the CPSU Central Committee and the USSR Council of Ministers, "On Supplementary Measures to Improve the Protection of Public Health," which notes that work in this direction is one of the most important social goals brought forth by the 26th CPSU Congress. In order to more fully satisfy the needs of the Soviet people with regard to protecting and strengthening health an extensive system of medical facilities has been created and is developing, including outpatient departments-polyclinics, hospital, pharmaceutical, medical hygiene and other facilities.

Thanks to the constant concern of the communist party for the well-being of the people significant successes have been achieved in the public health system in our republic. Today, on the eve of the 60th anniversary of the USSR, it is appropriate to remember that the first steps in public health in Belorussia after the victory of October were taken with the great selfless help of other peoples in the country, and first and foremost the great Russian people.

As noted at the 26th CPSU Congress, from the first days of Soviet power "our economic and social policies were developed in such a way as to elevate Russia's outlying districts of the past to the level of its center. This goal was successfully met."

In the area of public health this initially meant the elimination in Belorussia of the serious medical consequences of the First World War and Civil War. The multifaceted and selfless help of the Russian Federation in solving this problem was reflected in the constant work of medical personnel from the central regions of the country, in the assignment of local counter-epidemic, disinfection and inoculation detachments, disinfection trains to battle epidemics and in the creation of observation points and hospitals for infectious diseases. The

medical facilities of the BSSR were provided with medications, hospital and sterile supplies, medical instruments and so forth. Significant monetary sums were allocated to the Belorussian republic by RSFSR Narkomzdrav [People's Commissariat of Public Health] to battle epidemics.

An important measure in the struggle against epidemics and the lack of sanitation in the country was the attachment of the medical military service to the general system of civil public health. The inclusion in the systems of commissariats of public health of representatives from the medical military service facilitated the solution to problems related to providing local medical services, to the preparation of medical personnel for sanitation and defense work, to utilizing civil medical facilities for military needs and military facilities for civil needs. This provided the optimal approach to solving the public health problems of the country. A network of blocking and isolation-control points were created along the railroad lines of the BSSR (in Orsha, Borisov, Minsk, Lunints, Polotsk, etc.). They played an important role in interrupting epidemics among military workers and the migrating masses in the civil population.

The public health organs of Soviet Belorussia extensively utilized the organizational-methodological materials of RSFSR Narkomzdrav to create sanitation and counter-epidemic committees and to realize mass sanitation and health measures.

Relying on the basic principles of Soviet public health presented in the Leninist decrees of the RSFSR Sovnarkom [Soviet of people's commissars] and implementing them under the conditions found in Belorussia, the republic's public health organs completed the nationalization of medical and pharmaceutical facilities, joined rural pharmacies to propylactic-treatment organizations and began to create facilities for the care of mothers and children by September 1921 with the constant help of party and soviet organs.

With the aid of RSFSR Narkomzdrav the first health facilities for children and adolescents in the republic are being created near Minsk. In 1921 367 citizens of Belorussia were sent to sanatoriums and spas in the Crimea, the Caucasus, Odessa and other places by RSFSR Narkomzdrav.

It is difficult to overestimate the help of the RSFSR's public health organs in organizing the activities of medical-sanitation facilities in Belorussia during the years when the national economy was being rebuilt, especially as regards providing trained doctors and other medical personnel. This was done in the spirit of Leninist requirements. Vladimir Il'ich viewed training for all branches of the national economy as an integral part of the general goal of building a new state, as one of the fundamental conditions for the successful building of socialism.

The first decrees of the Soviet government directed at developing higher education in union republics, and in particular the decree of 21 January 1919, "On Founding a Number of New State Universities," were elaborated and personally signed by V. I. Lenin. This decree served as the basis for the republic resolution, "On the Foundation of the Belorussian State University in Minsk."

With the help of the RSFSR and the UkrSSR cadres for the medical department of the Belorussian State University were drawn from experienced professors of Moscow, Petrograd, Kiev, Smolensk and other universities in the country. In subsequent years the republic was given effective help in organizing and strengthening specialized medical scientific-research facilities--the Vitebsk and Minsk sanitation-bacteriological institutes, the Belorussian institutes of neurology and physiotherapy, trauma, for the health protection of mothers and children, sanitation-hygiene and others.

Among the most important goals during the pre-war five-year plans in the area of public health were: decreasing the incidence of disease and trauma, implementing sanitation and health measures, expanding and improving communal services to the working class, especially in the leading branches of industry, and improving the quality of these services. It was planned to expand the network of sanitation-counter epidemiological facilities and to strengthen their activities, to implement extensive health measures among working class youth and children, to improve sanitation for workers and to train and provide professional medical cadres for the medical facilities of cities and villages. Bringing medical aid to workers was implemented by organizing medical outpatient departments and points for basic medical services in enterprises. In order to fulfill these goals the republic's government passed a series of resolutions in the 1930's, directed at improving sanitation conditions of cities and villages and the activities of sanitation organs.

At that time an important role in the development of public health was played by measures developed and implemented by the party and state concerning medical-sanitation services to kolkhoz farmers, the building of medical-sanitation and communal facilities and the strengthening of rural medical divisions.

In January 1935 the bureau of the Central Committee of the Belorussian CP examined the question of the function of the organs of people's commissars in the BSSR public health system. After this the problems of public health in the republic were discussed at the 11th All-Belorussian Congress of Soviets and corresponding decisions were made. The organs of public health in the republic passed a number of measures to fulfill the resolutions that were passed.

Health restoration measures were widely implemented during those years. A mass approach was taken to cleanliness and sanitation in industry and in rural regions. The initiators of this approach in the republic were the workers of Rogachevskiy Rayon. Their innovation was picked up in other rayons and outside of Belorussia. The approach took on a national character. As a result of the realization of extensive health and prophylactic measures the level of national public health improved significantly. Suffice it to say that in comparison with 1913 by 1940 the number of hospital beds in Belorussia increased almost sixfold. Medical facilities were equipped with new technology, X-ray departments were created and clinical labs were instituted. New maternity houses were opened, including 219 in rural regions.

The treacherous attack on our country by German Fascists and the occupation left serious consequences for public health in Soviet Belorussia. These hard times

were followed by typhus epidemics, an almost complete prevalence of malaria, a sharp rise in trachoma and other serious infectious diseases. Most hospitals, outpatient departments and clinics, sanitation and epidemiological stations, anti-malaria stations and points, and so forth, were subject to barbarian destruction and looting.

The other peoples of the country came to the aid of Belorussia still during the war with the Fascists. In 1943 union organs passed resolutions concerning measures to help regions freed from German occupation. The Narkomzdrav of the USSR, RSFSR and Kazakh SSR took effective measures to help the Belorussian SSR to eliminate the medical and sanitation consequences of the war and occupation. In mid-1943 USSR Narkomzdrav made a decision to repost all native Belorussian natives-medical workers in the military to the freed regions of the republic. Considerable help was given to reestablishing the operation of the Belorussian (Minsk) Medical Institute in Yaroslavl. To fight the threat of epidemics anti-epidemiological and disinfection detachments were sent to the republic, and observational points and disinfection hospitals were created. Financial and material-technical aid was rendered for re-establishing health treatment and sanitation-counter epidemic facilities.

The fraternal help of union republics and the selfless labor of medical workers in Belorussia secured the elimination of mass diseases, enabled us to renew the network of medical facilities at the pre-war level immediately following the war and in some cases to surpass this level.

Today, in implementing the goals of the 26th party congress, we proudly recognize that the concrete concern for the individual and his needs is the springboard and ultimate aim of the socio-economic policies of the CPSU. In light of this the strengthening of the material-technical base of public health and the improved training of medical cadres represent an obvious manifestation of the efforts of the communist party and the Soviet state to protect and improve the health of the people, work conditions and the standard of living of workers.

In Belorussia, as in the country as a whole, there has been a steadfast improvement in the level of medical aid in the most massive and primary links of the public health system--in polyclinics, emergency medical service facilities, uchastok hospitals and rural outpatient departments. There is more extensive use of instruments, apparatuses and laboratories to diagnose the sick in rural regions. Regional therapeutic and pediatric medical units are expanding. Whereas in pre-revolutionary Belorussia the primary link in medical aid was represented by 139 outpatient departments with inpatient treatment in hospitals, in 1982 this type of service is rendered by 1,343 multi-profile, technically well-equipped polyclinic facilities. In addition rural areas have 3,000 physicians' assistant-midwife points for prophylactic care and pre-physician services. They are located near places where kolkhoz farmers reside and operate on the territory of every rural soviet, and in some rayons--in each kolkhoz. Constant improvements are taking place in emergency medical aid to city and village residents. A wide network of health centers, medical uchastoks working according to production principles has been created to provide additional medical-sanitation services to workers in industry and sovkhozes.

At the present time medical services to industrial workers and workers in building and transportation are provided by 1,217 medical and physician's assistant health centers and 21 medical-sanitation units, 11 of which have permanent establishments.

However, quantitative growth and increased possibilities for overseeing sanitation and hygiene measures are not the only things that are of importance. We are speaking about serious qualitative changes, about the inclusion of doctors in work that is directed at improving the effectiveness of the entire management apparatus. New impetus was given to this activity by the September 1977 resolution of the CPSU Central Committee and the USSR Council of Ministers, "On Measures to Further Improve National Public Health." In accordance with it, medical divisions were enlarged in the republic, medical health centers in industrial enterprises were reorganized into physician's assistant health centers, thereby freeing doctors to strengthen shop divisions.

The system of inpatient medical services changed radically during the years of Soviet power as well. Whereas in 1913 in Belorussia there were 9.3 beds per 10,000 population, by early 1982 there were 126.2 beds for the same number of people. Now beds are being concentrated basically in large multi-profile permanent facilities. This has been encouraged by an increase in the average capacity of oblast hospitals, which by late 1981 had reached 1,044 beds.

There have been qualitative changes in surgery. In recent years the republic has opened and is operating centers for kidney transplants, optical micro-surgery, for the treatment of ischemic heart disease and dysrhythmias with surgery and for the treatment of congenital and acquired heart disease, as well as many other diseases. Of the existing 34 republic centers of specialized medical services 15 have surgery capabilities. Surgery consultations and research are ongoing concerns, and aid is rendered to the surgeons of city and rural hospitals in the republic.

A task of great political and social importance--that of eliminating basic differences in the level of services to the urban and rural populations--is being worked on with great intensity. The material-technical base of rayon central hospitals, the basic link in the general specialization of medical aid to the rural population is being strengthened. The network of outpatient departments and clinics has been further developed. Since 1977 2,700 beds have been added to central rayon hospitals, and the number of beds in division hospitals has reached 16,200. In addition, the rural population obtains inpatient services in city hospitals in a significant volume.

During the 11th Five-Year Plan it is planned to utilize state capital investments to build 15 model rayon hospitals and eight complexes, and to begin the building of three more hospitals. In addition, with resources from a number of branches of the national economy it is planned to build 36 complexes of rayon hospitals, 31 uchastok hospitals, and over 200 outpatient departments and physician's assistant-midwife points in rural areas.

The republic's public health organs are developing cardiological, oncological, stomatological, endocrinological, gastroenterological and anesthesiological

services for the population. There has also been a consistent realization of one of the fundamental principles of synthesizing treatment and prophylactic services, which is reflected in the dispensary method of operation of medical facilities, especially specialized dispensaries, medical and sanitation divisions, and facilities for the health protection of the mother and child. Periodic prophylactic medical check-ups encompassed 4.14 million persons in 1981, or 42.9 percent of the total population. A consistent growth in the number of persons who are regularly examined prophylactically is characteristic for the BSSR. The active recognition of early forms of diseases on the basis of regular check-ups is an effective way to preserve the health of the people, as experience has shown.

The brightest manifestation of the preventative medicine direction in Soviet public health is the system of constant medical care to women and infants in the perinatal period. Today the system for the health protection of mothers and children has at its disposal a considerable material-technical base and a significant number of specially-trained cadres. In comparison with 1940 the number of hospital facilities for pregnant women, women in childbirth and women who recently gave birth has increased by 36 percent; the number of pediatric clinics and women's health centers has doubled.

In the republic a great deal of attention is given to medical services for invalids of the Great Fatherland War. They are encompassed by the dispensary system and are provided with medications and spa treatment.

The synthesis of preventative and treatment services has been clearly reflected in the organization of spas. During the pre-revolutionary period there were no spas in Belorussia; it was considered a locality void of possible treatment areas. It took time to show that the reverse was true. Research by Belorussian specialists determined that places such as Naroch', Zhdanovichi, Rogachev, Lettsy and Chenki were hardly inferior in medical and natural qualities to the well-known spas of the Crimea and Caucasus. With the active help of the Central Committee of the Belorussian CP and the republic's government in directing trade unions and public health organs, by the beginning of the 11th Five-Year Plan Belorussia had over 290 sanatoriums and rest spas (without one and two-day) for 42,800 persons. Each year about half a million persons make use of these.

An important role in the struggle for the health of the Soviet people and for the preservation of the environment is played by the youngest member of the socialist public health system--the sanitation-epidemiological service. At the present time in the republic it has 165 specialized stations with 1,800 doctors capable of careful state sanitation observations in all branches of the national economy.

Effective forms of hygiene education for the population have become very important--health universities and schools, specialized films and lectures, propaganda on the healthy way of life, the struggle against bad habits, and so forth.

All of this work has been facilitated by the growth of a medical intelligentsia in Belorussia during the years of Soviet power. This contingent is trained at three medical higher education institutes, the Belorussian Institute for the Advanced Training of Physicians, and 18 intermediate medical schools. By 1981 in comparison with 1913 the number of physicians in all specialties increased by a factor of 27, reaching 33,000 persons. The number of intermediate medical workers surpassed the pre-revolutionary level by a factor of 45. At the present time over 94,000 nurses, physician's assistants, midwives, laboratory technicians and other workers are working in the medical facilities of the BSSR.

The creation, with the aid of other institutes of higher learning, of the first medical faculty in Belorussia in the Belorussian State University (from 1930--Minsk Medical Institute) and then of the medical institutes in Vitebsk (1934) and Grodno (1958) laid the foundation for the preparation of our own medical cadres and had a positive effect on the development of scientific research in the area of medicine. With the active cooperation and practical aid of health organs and scientific centers of other union republics we created during the pre-war period and recreated after the Great Fatherland War 10 scientific-research institutes in the BSSR and the Belorussian Institute for the Advanced Training of Physicians, which became a large nationally-known center for the retraining of physicians and pharmacists--within its walls 52,000 specialists have increased their knowledge during the last 50 years.

At the present time in the republic we have a large detachment of medical personnel with a high level of training, including 170 doctors of science and 1,130 candidates of science.

With the aid of the fraternal peoples of the USSR the republic has solved many problems regarding medications supply for the population. Enterprises have been created to prepare bacteriological preparations and medicines. The network of pharmacies and pharmacy facilities in cities and rural areas is well-developed; senior and intermediate level pharmaceutical cadres are being trained.

All of this points to the fact that the system of Soviet public health has achieved considerable success during the years of Soviet power as a result of the constant concern demonstrated by the communist party.

While noting definite achievements in the work of public health organs, we should also note that there are serious shortcomings and unsolved problems that have a negative effect on the quality of medical aid to the population. This means that one of the goals presented by the 26th CPSU Congress is especially urgent today--to do everything possible to make sure that every Soviet person receives trained and rapid medical aid.

These words contain the battle program of action for all organs of national public health. Its specific landmarks in the light of the decisions of the 26th party congress were once again delineated in the resolution of the CPSU Central Committee and the USSR Council of Ministers, "On Supplementary Measures to Improve the Protection of Public Health." The enormous tasks placed before the system of medical care, before party, soviet, trade union organs locally and before administrative workers are a bright attestation of the fact

that the communist party and the Soviet state, while creatively developing Leninist ideas in the area of public health, are persistently realizing a course toward satisfying the most important needs in life and toward increasing the longevity of the Soviet people.

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SOVIET ACHIEVEMENTS IN PUBLIC HEALTH DISCUSSED

Moscow SOVETSKOYE ZDRAVOKHRANENIYE in Russian No 12, Dec 82
(manuscript received 27 Sept 82) pp 5-12

[Article by USSR Minister of Health S. P. Burenkov: "Public Health in the USSR"]

[Text] On December 30, 1982, our country marks the completion of 60 years since the founding of the Union of Soviet Socialist Republics. This was a significant event in the life of our nation. The creation of the USSR was the continuation of Great October's cause, the greatest achievement of the Communist Party and a living embodiment of the idea of V. I. Lenin and the principles of national policy which he set forth. History knows no nation that has done as much, in a very short time, for the total development of nations and nationalities as the USSR. The last 60 years have been characterized by rapid socioeconomic progress in all the Union republics. An advanced socialist society has been established. A new historic community of people - the Soviet people - has been formed. The socialist way of life was confirmed. Tremendous social and political victories gained by the Soviet people were grounded in the new USSR Constitution, which signified a historic milestone in the progress of the Soviet people.

Today the Soviet Union is a mighty socialist industrialized power with highly mechanized agriculture and an advanced scientific and cultural niveau. National income has grown many times over in this period. The share of the USSR in world production rose from 1% in 1922 to 20% at present. The growth of the Union of Soviet Socialist Republics has been dynamic. Its further development has been determined by the historic resolutions of the 26th CPSU Congress, the November (1981) Plenum of the CPSU Central Committee and the May (1982) Plenum of the CPSU Central Committee, which confirmed the Food Program to 1990 and by the policy speeches at these forums by General Secretary, CPSU Central Committee and Chairman, Presidium of the USSR Supreme Soviet Comrade L.I. Brezhnev and by the USSR Statute on the State Plan for Economic and Social Development of the Nation in 1981-85.

The mightiest achievement of the Soviet state is the creation of the socialist public health system - a completely new, superior stage in the health care of the society. It is based on Leninist principles of socialist public health care that are exceptionally profound and progressive, as well as in political and scientific

importance: state management, freedom from costs and accessibility to all, a preventive orientation, unity of theory and practice, national identity and socialist humanism. The most urgent demands in the public health area, as set forth in the Party Program at the 7th Russian Communist Party (Bolshevik) Congress and creatively developed in the new CPSU Program, in resolutions adopted at Party congresses and in other policy documents, are clearly reflected in the decree of the CPSU Central Committee and the USSR Council of Ministers "Measures for the Further Improvement of Public Health in our Nation".

"Among our social tasks," noted Comrade L. I. Brezhnev in the concluding address at the 25th CPSU Congress, "none is more important than concern for the health of the Soviet people." Health care for the Soviet nation has its foundations in the law. It is guaranteed by more than 20 articles of the new USSR Constitution and regulated by the USSR and republics' Fundamental Legislative Principles concerning public health and it is secured by a network of state, social, community and medical measures. "The socialist state," it is stated in the CPSU Program, "is the only governmental form that maintains concern for guarding and constantly improving the health of the entire population."

The government of the Soviet Union and the Communist Party have developed and are consistently following a course leading to rapid growth and uninterrupted amelioration of public health in all the republics of the USSR. Substantial material and financial resources are released for these goals. In the 10th Five-Year Plan alone, the public health appropriation from the state budget for public health (not taking into account education in science and medicine) increased to 1.3 times the amount appropriated in the 9th Five-Year Plan, or 66.6 billion R. The production and distribution of pharmaceuticals grew to 1.4 times the previous value and that of medical technology to 1.5 times as much as before. About 7 billion R was channeled as capital investments into strengthening the material and technical bases of public health. In the 11th Five-Year Plan, appropriations are also rising. In 1981, expenditures for public health and physical culture rose to more than 16 times the 1940 figure, reaching 15.2 billion R.

Thanks to state management and planning, public health can be centrally directed on a national scale while local agencies retain a wide scope for their powers; a modern material and technical base can be created rapidly both in public health and in medical science; equally accelerated growth can be shown in the medical industry, in the training of medical and scientific cadres, in preventive medicine and hygienic epidemiology among the population and all directions of medical science and its practical applications.

The mighty material and technical base of public health in the USSR represents a major branch of the economy, one which supplies to the urban and rural population free, totally accessible and high-quality health care. According to many indicators, Soviet public health has first place worldwide, but it began under difficult conditions, as we know. The population's hygienic level was extremely low. The

network of medical institutions was inadequate and their material base - quite meager. In 1913, the entire country had 5300 hospitals and 5700 dispensaries; there were 1.8 physicians to every 10,000 persons and approximately three medical workers to this number, while there was no hygienic epidemiological service. There was almost no domestic medical industry.

Thanks to a scientifically founded Leninist cadre policy, a large number of medical workers were trained in the USSR for active service in implementing large-scale socioeconomic programs; they made a ponderable contribution to health care for the Soviet people and the cause of the newly developed society. Today, more than 6 million persons are at work in public health including 1,330,000 physicians (38.5 to 10,000 population) and 2.9 million middle medical workers (107.3 to 10,000 population).

The number of physicians is high in all the republics, one of the basic indicators of public health progress. Today the number of physicians per capita in Kazakhstan and the Central Asian republics is higher than in England, France, Japan, Turkey or Iran. In the Soviet Baltic republics, compared to 1940, the number of physicians also increased: in Lithuania to 7 times and in Estonia to almost 6 times that number and in Latvia to over 4 times the 1940 figure. In these republics, this indicator is higher than in any developed capitalist country. In all the USSR republics, there are medical institutes or medical faculties. There are, for example, 6 of them in Kazakhstan and 5 in Uzbekistan, with, in all, 85 medical institutes in the country. In the 11th Five-Year Plan, almost an additional 255,000 physicians will be trained and a 14% increase in enrollment in middle training institutions for medicine.

The Soviet Union has taken one of the foremost places worldwide in hospital beds per capita. The total number of beds has reached 3.3 million or 126 per 10,000 population. While the number of hospital beds increased to 9.7 times the 1913 figure overall, in Kazakhstan it rose to 41 times the earlier value, in Turkmenistan to 39 times and in Kirghizia to 100 times as well as to 50 times the 1913 number in Uzbekistan and over 250 times in Tajikistan. At present the number of hospital beds available to the population of the USSR exceeds that in the USA, England, Italy and other capitalist countries. In all republics of the USSR, in-patient care is equally accessible to urban and rural dwellers. In the 11th Five-Year Plan, there will be an 8-10% increase in the fund of hospital beds.

Thanks to the expansion of the hospital network (there are now 23,100), not only has hospital care been extended to constitute the necessary dimensions, but also its quality has been radically improved. The whole increase in hospital beds is based on new construction of large hospitals and departmental wards in existing institutions with organization of specialized sections. The large-scale specialized sections are basically designed as centers for specialized care of a quality suited to the respective republic, regional and oblast-level hospitals. In the fields of anesthesiology and resuscitation, there are now being organized large-scale specialized centers at the USSR and inter-republic (interoblast) levels.

Our country was the first to establish a system of out-patient care in polyclinics as a form of generally accessible, high-quality, specialized mass health care. It received wide recognition in socialist countries and is recommended by WHO to countries in the process of creating a national public health service. In the USSR republics, development is planned of an extensive network of institutions separate from the hospitals whose total number is to be 36,000. Over 2.8 billion patient-visits are made annually to the physicians of the out-patient polyclinics, evidence of the accessibility of this service. In the 10th Five-Year Plan alone, the number of visits to a physician rose by 9% among urban dwellers and by 26% among the rural population.

In recent years, the polyclinic system has been characterized by the organization and construction of large-scale polyclinics, the expansion of the existing ones and the installment in them of contemporary equipment. In addition, specialized care has been made more widely available, rehabilitation has been upgraded etc. The number of specialized units within the general polyclinic system has been greatly increased. Measures to improve health care on the district level are constantly being increased, making subdivision of territorial medical districts possible. At the end of the 11th Five-Year Plan the number of persons in relation to one uchastok physician-therapist will reach 1,700 on the average. The number of children in relation to one uchastok pediatric physician has been reduced to 800 on the average.

It must be pointed out that the extensive specialization and integration of medical care achieved in the Soviet Union has become a general direction in improving its quality. New specialized services are being created and have been created. In the 10th Five-Year Plan, a cardiological service was organized, largely in the USSR Cardiological Scientific Center. In the USSR Republics there were 14 cardiological institutes. By the end of the 11th Five-Year Plan, organization is planned of republic, kray, and oblast cardiological dispensaries, significant expansion of the network of cardiological sections in hospitals and units in polyclinics, and an increase in the number of cardiological brigades in emergency medical care units.

The USSR Oncological Scientific Center and an extensive network of scientific research institutions and practical institutions offer oncological care. Other highly developed services are stomatological, ophthalmological and others.

Fulfilling V. I. Lenin's teaching, "Children must have the best of everything," all the USSR republics have established large-scale socioeconomic and medical systems to protect the health of mothers and children and take into account the fact that women participate actively in an occupation and in the community. A number of decrees of significance have been adopted for this purpose by the Party and the government. The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures to Strengthen State Aid to Families with Children" stipulates economic and social measures, cutting across plans, to provide women with better

conditions for the rearing of children. Substantial appropriations from the means of All-Union Communist Work Saturdays are allotted to the protection of maternal and child health.

Before the Revolution, there were only nine consultation clinics for women and children in the country altogether. Nearly 25,000 pediatric polyclinics and consultation clinics for women exist today, with 186,900 gynecological beds in hospitals and 228,100 beds for pregnant women and women in labor. There are 574,200 beds for children. Specialized medical care for women and children, pediatric resuscitation and a system of graduated pediatric care have been developed. A USSR Scientific Research Center for Protection of Maternal and Child Health has been established to solve certain problems more rapidly and similar centers are arising in USSR republics. A system of uninterrupted medical examination and observation of maternal and child health is a very concrete embodiment of the preventive ideal of Soviet public health.

Workers in our country, from the beginnings of Soviet power, have had a right to preferential medical care. An extensive system of therapeutic and preventive institutions within the very industrial enterprises exists in Soviet republics. At the same time, medical services are rendered to workers by a network of territorial institutions. Enterprise workers and employees who have no medical and hygienic units at the workplace are served preferentially at the territorial therapeutic and preventive institutions. In these institutions there are work-station units. All the workers' health problems are resolved within the framework of a unified, complex plan of sanitation measures.

The rural health service represents an important achievement. The complex of therapeutic and preventive institutions rendering medical aid to the rural population comprises oblast (kray, republic) and central hospitals at the rayon level, rural hospital and out-patient units, and units staffed by medical assistants or medical assistants and midwives, as well as other types of unit. On a large-scale, a network of rural therapeutic and preventive institutions is being developed, their material and technical basis is being strengthened, specialized equipment and supplies are being distributed and medical cadres fitted out. At present, in the boundaries of each rural rayon, specialized medical aid can be rendered by not fewer than 10 medical specialists. The hospital care of urban and rural dwellers is now equalized.

In pharmacy and medical technology, the USSR has solved many problems. A national medical industry meets the basic needs for pharmaceuticals, instruments etc. In the country, there is an extensive network of pharmacies and pharmaceutical institutions. In the 10th Five-Year Plan the number of pharmacies rose by 7.5% to 27,000. Pharmaceutical cadres are being trained.

Only in a socialist society, where preventive medicine is the task of the state in strengthening the health of the whole nation, has this concept been realized. In the USSR, preventive medicine has become a general direction of public health.

It represents a whole system of socioeconomic measures directed not only at the protection of health and the prevention of disease, but at the harmonious growth of the Soviet person in which it embraces his entire life. During the 10th Five-Year Plan, expenditures from the state budget, for example, for environmental protection, and for the rational use of natural resources rose to 1.5 times the expenditures for these purposes in the 9th Five-Year Plan.

Preventive medicine is a basis for all branches of public health activity: the fight against infectious diseases; the protection of mothers, children and industrial workers and the fight against traumatism and other diseases.

The sanitary-epidemiological service has rendered the country great aid.

In September 1922 the RSFSR Soviet of People's Commissars adopted the decree establishing the country's hygienic agencies. The first state-directed sanitary surveillance in the world was created. In all the USSR republics, a sanitary-epidemiological service was established in addition. At present it comprises 4,900 sanitary-epidemiological stations. As a scientific base, it benefits from scientific research institutes and numerous hygiene and epidemiology departments in medical schools and physicians' advanced education. The achievements of Soviet epidemiologists and hygienists are well known.

No single state has scientific potential equal to the Soviet Union's in the medical field. A wide-ranging chain of medical scientific research institutions is headed by the USSR Academy of Medical Sciences. In the 10th Five-Year Plan alone, 30 scientific collectives were organized. At the beginning of the 11th Five-Year Plan, the All-Union Center for Mental Health was opened, as were the Enzymology Institute and a number of others. The scientific institutions of all the republics were developed further. Scientific studies are carried on at medical and pharmaceutical institutes, at university medical faculties and in institutes for the advanced education of physicians. Medical scholars in the USSR republics concentrate on problems with current importance for public health, on preventive measures, upon rapidly introducing and employing new methods of prevention, diagnosis and therapeutics and upon new pharmaceuticals, preparations and technological innovations. Important advances have been achieved in cardiology, oncology, pulmonology, endocrinology, surgery, the protection of maternal and child health and other medical fields. The advances in prevention, diagnosis and treatment of infectious diseases are widely known. In the 10th Five-Year Plan alone, over 200 new pharmaceutical preparations and more than 900 modern types of medical technology were introduced. In a number of directions, Soviet medicine occupies primary rank worldwide.

In the 11th Five-Year Plan, medical science is faced with exceptionally great challenges. At present, the state programs for development and implementation are being realized in the effective method of prevention, diagnosis and treatment

of cardiovascular disease, malignant neoplasms, leukosarcomas, basic maternal and child diseases, nonspecific pulmonary diseases, mental and genetically transmitted diseases and a number of others. Joint scientific research institutions of the USSR Academy of Sciences and the ministries and departments are becoming more widespread in the most important directions of medical science and technology.

The Leninist principles and the experience of Soviet public health embodied in the socialist countries have achieved international recognition. The potential of the socialist health care system is so convincing that its most important principles and assumptions are officially approved by the World Health Organization and recommended to all states that are members of WHO. The highest acclaim for Soviet public health and public health in Kazakhstan was given at the Alma-Ata international conference for primary medical and hygienic aid, in which specialists from 138 of the world's nations took part. Health care in the USSR and fraternal socialist nations was established as an international system and has had an appreciable influence on the worldwide development of public health.

The USSR cooperates in the field of public health and medical science with more than 70 countries. Most fruitful is the collaboration with socialist countries. Our nation renders disinterested aid to developing countries in establishing a national public health service and in combatting the spread of disease. The USSR contributes greatly to the resolution of international medical problems and takes an active part in the World Health Organization.

The Leninist peace strategy, as realized in the resolutions of the 26th CPSU Congress, in presenting a peace program for the 1980's, helps to expand cooperation in the field of public health and medicine with the capitalist countries. Soviet medical specialists are found among active partisans of world peace, health and life, as evidenced by the organization of the Soviet committee "Physicians of the World for Prevention of Nuclear War."

The basic directions of further perfection of health care for the Soviet people have been set down in the resolutions of the 26th CPSU Congress, the May (1982) Plenum of the CPSU Central Committee and the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures for the Further Improvement of National Public Health." In emphasizing the importance of the problems facing public health and the entire medical community, Comrade L. I. Brezhnev said, in the Concluding Address of the 26th Party Congress: "It is necessary to do everything to enable the Soviet citizen - always and everywhere - to receive modern, high-quality and sensitive medical care."

A new, clear example of the Party's and the government's constant care for the health of the Soviet people was given by the decree of the CPSU Central Committee and the USSR Council of Ministers "On Additional Measures to Improve Health Care for the Population." The goal of the decree is the emendation in the shortest possible time of existing shortcomings in health care and the most rapid possible solution to outstanding problems. It presents strict demands to the organizers of health care, medical administrators and all medical workers.

The decree stipulates extensive further development of the preventive activity of Soviet public health. Before the USSR Ministry of Health and the USSR Academy of Medical Sciences as well as the republic councils of ministers and the ministries and departments, in addition to the AUCCTU and the Komsomol Central Committee, stand the tasks of developing in 1983-84 and implementing by 1990 the complex program to strengthen prevention of illness and consolidate the nation's health. There will be expansion of scientific investigation to study the causes of cardiovascular, oncological, pulmonary, endocrine-related and other noninfectious diseases and there will be study of the scientific bases, in regard to these illnesses, for primary prevention and effective methods of diagnosis and treatment. Increased preventive activity by nonhospital organizations will be furthered by organization of preventive departments in all major polyclinics and expansion of the system of consultation and diagnosis in the polyclinics and medical-genetics consulting units as well as diagnostic units (centers) in republic, kray, and oblast hospitals for early diagnosis of cardiovascular disease. To coordinate activities in prevention of illnesses and strengthen the population's health an interdepartmental council has been created at the USSR Ministry of Health.

The 26th CPSU Congress has set as one of its most important tasks the increased effectiveness of dispensaries and their greater scope within the population. Even now the number of patients in the system is 48.5 million, and 114.8 million persons were examined in regular preventive work in 1981. To expand this work, measures stipulated in the decree to work out and practice new techniques must be taken: medical microanalysis, manufacture of instruments and reagents for clinical and biochemical studies.

It must be mentioned that the output of the medical industry will rise in the 11th Five-Year Plan to 1.4 times the previous value. The ministries and departments concerned in this have been charged with supplying medical technology, especially to the institutions of the primary chain of health care. The output of drugs, including those of preventive importance, will also grow. The effectiveness of the state sanitary inspectors must be improved, above all in agricultural and industrial hygiene. The further strengthening of sanitary-epidemiological stations must be improved as well as inter-rayon laboratories within them.

Additional measures of the decree cover building and equipping of modern hospitals, polyclinics, outpatient units, pharmacies and other health-care units. Approval has been given to construction of new maternity houses and expansion and remodeling of existing ones; the same is true of consultation units for women and pediatric clinics using funds set aside for construction of production units.

There are major plans for rural public health. Some 1950 outpatient units run by physicians will be organized in the 11th Five-Year Plan merely from the funds of kolkhozes and sovkhozes. By 1985 the full development in rural areas of a emergency care system should be completed. There must be implementation of measures to bring medical specialists closer to farm workers and improve central rayon and oblast hospitals.

In the decree, special attention is paid to improved training and use of medical cadres, to their education and to upgrading their qualifications. The new requirements concerning training of cadres as a primary link present renewed demands for the organization of the process of studies. In this connection, there have been additions to the plans of study and program of higher and middle medical educational institutions.

Provision is made for granting privileges to middle medical personnel in mobile brigades for emergency and immediate aid and in airborne medicine stations and departments of planned and urgent consultations when these have performed uninterrupted service. The ministries and departments and Councils of Ministers of the USSR republics have been granted the right to permit to the sovkhozes and other agricultural enterprises and organizations and to recommend to kolkhozes that they pay compensation - according to the annual operating result of enterprises and organizations - to medical workers of rural district hospitals, out-patient clinics, units staffed by medical assistants and midwives and rest and preventive centers, adding improvements in indicators of hygiene and lowering illness among workers.

The decree obligates Party and Soviet agencies, ministries and departments to continue fulfilling the tasks set by the decree of the CPSU Central Committee and the USSR Council of Ministers "Measures for the Further Improvement of Public Health in our Nation" and to join trade-union, Komsomol and other social organizations in carrying out supplemental measures to better organize medical care for the population of our country.

There is no doubt that health-care workers and medical scientists will do everything to realize the resolutions of the Party and government and to strengthen the Soviet people's health.

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BELORUSSIAN SSR NOTES PROGRESS IN PUBLIC HEALTH

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 12, Dec 82
(manuscript received 9 Aug 82) pp 19-22

[Article by BeSSR Minister of Health N. Ye. Savchenko: "Friendship Among Peoples and Public Health in Belorussia"]

[Text] The creation of the Union of Soviet Socialist Republics opened up to all the peoples of the country unprecedented opportunities for harmonious growth under conditions of mutual aid, socialist specialization and integration of all branches of the economy. The mutual advantage is experienced by each republic, as it receives everything needed for successful development, and the entire country, which has attained unlimited possibilities for specialization and the rational exploitation of resources and potential of each republic.

For example, Belorussia, while not mining metal ores, occupies a notable position in the country's production of tractors and automobiles. The earth's interior yields 40% of the entire potassium fertilizer of the country. A similar contribution is made to production of meat, milk and other agricultural products.

Without the participation and help of the entire country, it would be impossible to imagine the growth in Belorussia of such giant chemical undertakings as the Grodno nitrogen-fertilizer combine, the Soligorsk potassium combine and the Gomel superphosphate combine, the Polotsk petroleum refining combine, the Mogilev synthetic-fiber combine and the very large automotive plants in Minsk and Khodino and the Minsk tractor plant.

The same may be said of 33 institutions of higher learning in the Republic and the Belorussian Academy of Sciences, whose scientific works are known far beyond the boundaries of the country.

In the Republic, public health also depended on help from the fraternal republics at every step of its development.

There is no necessity of relating in detail the pre-Revolutionary legacy received by our republic. It is well known. It is enough to say that there were altogether 1167 physicians on Belorussian territory (1.7 physicians to 10,000 of population),

2180 middle-level medical workers (3.2 per 10,000 of population) and 240 small hospitals with 6445 beds (9.3 beds per 10,000 of population). There were altogether 274 beds for pregnant women and delivery; in the out-patient clinics, 139 in number, one doctor worked, as a rule. Even care given by a medical assistant was a luxury since there was a total of 224 functioning units staffed by medical assistants.

Despite the specific work carried out under the conditions of the Civil War and Counter-Revolution on the Republic's territory to lay the foundations for socialist public health, the picture had changed little by 1922, chiefly because cadres were lacking, no physicians native to Belorussia having been trained before the Revolution and middle-level medical workers having studied only at the school in Mogilev.

Given these conditions, it was crucial for the Republic's continued development in medicine that a university with a medical faculty was opened in Belorussia in 1921 on the initiative of V. I. Lenin and was quickly converted to an autonomous medical institute. Of course, it would have been impossible to found either hospital or institute without the broad-based help of cadres and the use of equipment from the side of the country's medical institutes as these had already been formed in the largest cities and elsewhere. The first professors and docents of the medical faculty were scientists sent to Minsk from Moscow, Leningrad, Kiev, Khar'kov, Smolensk and other cities. To the annals of BeSSR medical history were added the names of V. A. Leonov, I. T. Titov, S. M. Melkikh, M. B. Krol', academicians; M. P. Sokolovskiy, M. L. Bydrin, S. M. Burak, L. P. Rozanov, S. M. Rubashov and B. Ya. El'bert, professors, who for years headed the chairs of the faculty, then of the Minsk Medical Institute and prepared more than one generation of pre-war physicians, as well as creating indigenous Belorussian scientific schools and leaving ineradicable traces in the memory of the Belorussian people.

The training of qualified physicians at the Minsk medical institute, which graduated its first class in 1927, created a reliable basis for organizing systematic training of middle-level medical workers; a number of medical secondary schools staffed by trained physician instructors was opened.

In the 1920's, many more scientific research institutes were founded. In 1923-29 six were established and two more scientific research institutes of the Ministry of Health of the BeSSR followed. Scientists who had worked at the central scientific research institutes in Moscow, Leningrad, Kiev and other cities of our country were the nucleus of the newly formed institutes. In 1932, the Belorussian Institute for Advanced Training of Physicians was formed in Minsk.

This progress in training cadres before the war made possible a radical change in the public health of Belorussia. In 1940 there were already 5200 physicians in the republic's territory. The number of middle-level medical workers was 17,900; more than twice as many hospitals existed and more than 4.5 times as many beds, while the available units staffed by medical assistants and midwives had risen to 6 times the previous value and the out-patient clinics to 11 times the earlier number. There was a newly created network of consultation units for women and children, sanitary-epidemiological units and preventive dispensaries.

This work yielded positive results. Juvenile mortality was reduced by several times the original figure as were tuberculosis and infectious diseases with their mortality and life expectancy was lengthened.

Russian and the other fraternal peoples of our country contributed enormously to this progress. They sent scientists and physicians and aided in systematizing training of cadres and establishing the entire system of pre-war public health of Belorussia.

Belorussian medics paid their international debt in considerable measure during the Great Patriotic War. They were the first group of Soviet medics to go to the front and provided 570 physicians and around 2,000 middle-level medical workers. Their lot was not an easy one. They treated the wounded virtually without drugs or bandages, performed amputations with a metal saw and almost without anesthesia and worked under blockade conditions. Nor was it their fate only to heal the sick and the wounded. Physician A. I. Shuba, who was later awarded the honor Hero of Socialist Labor in peacetime, became the commander of a partisan brigade. Nadya Troyan, a student at Vitebsk Medical Institute, fought in the partisan lines. Entering the gas chamber with proudly raised head alongside his wife was Professor Ye. V. Klumov, who had supplied the partisans with drugs and bandages. N. V. Troyan and E. V. Klumov were awarded the honor Hero of the Soviet Union. The brother of Docent Kuvshinov was hanged by fascist butchers. During the war, thousands of physicians and nurses fell and all scientific research institutes and medical institutes as well as 80% of therapeutic and preventive institutions were destroyed. Epidemics of exanthematic and peritoneal typhus were the horrible consequences of the war, as were dysentery, malaria and other epidemics.

Once again the fraternal republics came to the aid of Belorussia. Without this help, the traces of war could not have been eradicated, much less in the short time in which this was accomplished. Help came from Moscow, Leningrad, from the Ukraine and from the Central Asian republics. The restored institutes, like those founded in the 1920's, were staffed by scientists from all parts of the country. The majority of them cast in their lot with Belorussia for a lifetime. From the collectives formed of numerous scientists came Professors P. N. Maslov, T. Ye. Gnilorybov, Yu. V. Gul'kevich, M. A. Merezhinskiy, I. D. Mishenin and A. Yu. Bronovitskiy.

Physicians and middle-level medical workers, drugs, instruments and equipment were sent to the republic. Special anti-epidemic detachments facilitated the rapid conquest of epidemics.

An indication of the help given by fraternal nations is the short time in which scientific and therapeutic-preventive institutions were restored. All eight scientific research institutes resumed work in the first six months after the liberation of Belorussia, with some of them opening even before the entire republic had been freed (for example, the Tuberculosis Institute, which reinstated its activity in liberated Gomel).

Even by 1946-47, pre-war figures had again been reached by the numbers of physicians, middle-level medical personnel, hospitals and beds, units staffed by medical assistants and midwives and other institutions. By 1950, all pre-war indicators had been surpassed except the number of beds for pregnant women and delivery and the institutions for pre-school children. Thus, the number of physicians in pre-war 1940 was 5,200, in 1945 3,100 and in 1947 5,200. It is not necessary to say that the republic could not achieve such increases in physicians and medical workers in two years by itself. In 1940 there were 17,900, in 1945 13,800 and in 1947 19,100.

The previous number of hospitals was reached and then surpassed already in 1945 (in 1940 - 514, in 1945 - 597), the number of beds in 1947 (in 1940 - 29,600, in 1945 - 26,400, in 1947 - 29,300). The figure for units staffed by medical assistants and midwives surpassed the prewar number in 1946. One indicator alone was not restored for 15 years (in 1960) - that for institutions for pre-school children.

The whole postwar history of Belorussian public health is a brilliant example of fraternal aid from the republics of our country. Obviously, every republic experiences in developing health care phases fraught with problems, the resolution of which is possible only with outside help. In this lies our strength - each one knows that aid will certainly be rendered at the crucial moment.

Such aid was received by Belorussia especially in creating new, large-scale institutions. In 1958, when the third medical institute (chronologically) was being founded, that in Grodno, many chairs and docent positions were filled by scientists from the Ukraine, Leningrad, Transcaucasia, Central Asia and many institutes of the Russian Federation.

We welcomed this help. Our way led to a short rise of the Grodno medical institute to contemporary status. At present, this is an institution of high quality at which physicians and local scientific research and teaching cadres are trained. Since the first class graduated, 18 years have passed and out of the first graduates have come professors and docents occupying leading teaching posts not only "at home" but in the institutions of higher learning in other republics. The Grodno medical institute has begun to pay back its debt for aid rendered.

Belorussian medical science also received significant aid in creating new scientific research institutes and scientific fields. In the establishment of the Belorussian Scientific Research Institute for Oncology, the largest in the country, in 1960, and the installation there of the most modern equipment made in the USSR (including a 25-Mev linear accelerator), the leading institutes of Moscow, Leningrad, Kiev, the USSR Academy of Sciences, the USSR Academy of Medical Sciences and tens of industrial enterprises participated. Now this is a contemporary scientific institution that carries on independent, interesting and important scientific research.

The affiliate of the USSR Academy of Medical Sciences' Institute of Genetics, founded in Belorussia in 1981, is being consolidated. The Institute of Genetics constantly aids its affiliate in research subject matter and equipment.

Transplantology in Belorussia was developed with ongoing help from the USSR Ministry of Health's Institute for Organ and Tissue Transplantation in the areas of organization, methods and consultation. Belorussia is now a center for kidney transplants among other large-scale centers in the country.

The USSR Academy of Medical Sciences' Institute of Cardiovascular Surgery and the All-Union Scientific Center for Surgery of the USSR Academy of Medical Sciences contributed a great deal of work to the founding of a department of cardiovascular surgery at the Belorussian Institute of Cardiology, founded in 1977.

In 1981, a combined meeting of the presidiums of the USSR Academy of Medical Sciences, the BeSSR Academy of Sciences and the BeSSR Ministry of Health Board was held for discussion of the coordination of scientific research and the large-scale utilization of the forces of the Academy of Sciences of the BeSSR to solve medical problems. The resolutions passed at this meeting were the basis for a complex program of scientific research in medicine.

Thus, Belorussian public health received generous and disinterested help from the fraternal republics of the whole country at every stage of its development. We consider such aid to be a major indicator of the international friendship of nations of all republics of the Soviet Union and a reliable guarantee of future successful resolution of ever more complex tasks, imposed by the resolutions of the 26th CPSU Congress, by the public health services of Belorussia and the other fraternal republics.

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CSO: 1840/322

HISTORY OF PUBLIC HEALTH IN UZBEKISTAN

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 12, Dec 82
(manuscript received 12 Jul 82) pp 22-27

[Article by UzSSR Minister of Health A. M. Khudaybergenov: "Progress and Perspectives of Public Health in Uzbekistan"]

[Text] Six decades separate us from the time when the will of the people and the leadership of the Bolshevik party under Vladimir Il'ich Lenin joined to create the Union of Soviet Socialist Republics, the first country to become a true motherland to all the peoples and nationalities inhabiting it.

All the advantages of socialist structure are exemplified by our republic, previously a backward outlying district of czarist Russia. This example shows the accomplishment of a free nation - the inspired creator of new life.

In Uzbekistan, that which received the warmest support and approval were the words of Sh. R. Rashidov, candidate for the CPSU Central Committee and first secretary of the Uzbek CP Central Committee to the effect that the flourishing of the Uzbek SSR, our magnificent achievements were the personification of the socialist way of life and the result of indestructible friendship, cooperation and mutual aid among all fraternal nations of the USSR and above all the great Russian nation. This friendship represents a priceless treasure and one of the great conquests of socialism and the Leninist national policy of the CPSU.

In a relatively short historical period, Uzbekistan was transformed from a backward outlying district of czarist Russia, a significant part of whose population was infected with malaria, guinea worm, trachoma and diseases brought by raging epidemics: cholera and smallpox, into a flourishing republic with a highly developed economy and a coherent system of socialist public health.

In speaking of the importance of Uzbekistan for our country's economy, one need only cite some figures. Our republic yields 63% of the country's entire cotton crop, 34% of its astrakhan and 100% of its kenaf; all domestic manufacture of cotton picking machines is concentrated here where, in addition, a significant proportion

of our gold, gas and many other products are obtained. Until the Great October Revolution, there was virtually no industry in Uzbekistan nor could its agriculture provide even a part of the population's needs.

The national public health service of Uzbekistan represents a sophisticated net of therapeutic, preventive, and anti-epidemic institutions. Over 2,300 medical institutions are functioning in the republic with outpatient care; there are 1,200 hospitals and around 200 medical care units staffed by physicians and over 5,700 units staffed by medical assistants and midwives and also 1,554 pharmacies.

Mandatory budgetary appropriations formed the real foundation of this system. Thus in the 10th Five-Year Plan alone, more than 3 billion R was spent for the requirements of the health care system, compared to 2.2 billion in 1971-1975. The average expenditure for health care per inhabitant in Uzbekistan is now 48 R 90 k annually but was altogether 14 k in 1913, i.e. a little over 6 decades ago. One must add to the above that the republic's government and the oblispolkoms contribute annually an additional 20-30 million R to health care over and above the budgeted means. Thanks to this, capital investments have substantially increased in the last few years, which has made possible an increase in the number of hospital beds. This doubtless provides improvement of sanitary conditions and new, more effective equipment. The expenses for capital repairs in buildings of therapeutic and preventive institutions and for purchase of medical and maintenance equipment grow annually.

In recent years, we are obtaining more and more means of enterprises for building polyclinics in cities and means of kolkhozes and sovkhozes for constructing and renovating outpatient clinics and units staffed by medical assistants and midwives in rural areas.

In the 10th Five-Year Plan alone the number of hospital beds grew by more than 37,000 and amounts to over 191,100 at present; the population is supplied with hospital beds at a rate equivalent to the highest indicators for the Soviet Union. There has been a substantial improvement in the drug supply as well as growth in the amount of technical equipment installed in institutions of public health and in the volume of therapeutic and preventive care of the population.

Outpatient polyclinics numbering 360 have gone under construction; their capacity is over 26,000 visits per shift. Over 625 units have increased the urban medical sites. A system of medical care for workers of industrial enterprises and the construction and transport industries has been perfected. There have been 88 additional section-units giving medical care and 7 major medical and hygienic departments.

In the 10th Five-Year Plan, enormous work was done to develop specialized forms of medical aid. At present in the city there are 30 and in rural areas 28 types. Many

new consulting units for cardiology and cardiovascular dispensaries and departments have been opened as well as stomatological polyclinics and psychiatric and narcological departments have been expanded.

The indicators for physicians, middle-level medical workers and aides per capita have increased. In 1981, Uzbekistan counted over 49,251 physicians or 29.7 per 10,000 of population, a significant advance over this indicator in many economically developed capitalist countries not only of Asia, but also of Europe.

In the light of the 26th CPSU Congress resolutions, one of the most important tasks in the republic's public health activity is continuing to increase the efficiency and raise the quality of medical care and protection of health for the people. To a large extent, progress in implementing this most important of objectives depends on further perfecting the organization and administration of the most widespread form of medical care: the polyclinic. It was precisely for this reason that, in the spirit of the CPSU Central Committee and the USSR Council of Ministers' decree "Measures for the Further Improvement of Public Health in Our Nation", Uzbekistan vigorously promoted polyclinic care and a strengthening of the material base of this service, in connection with which construction of outpatient polyclinics is to be extended; a major effort is being devoted to subdividing medical uchastoks.

From the first days of Soviet power, our government gave increasing thought to the health of women and children. The CPSU Central Committee and the UzSSR government have adopted a number of important decrees directed at radical improvement of therapeutic and preventive care for children and mothers. This has had a great influence on the further development of the entire gynecological-pediatric system in our republic. Under Soviet power, especially in the 10th Five-Year Plan, many pediatric and obstetric institutions were built in the republic and their location and capacity were improved, while more pediatricians and midwives/gynecological workers were employed. At present, there are 46,771 hospital beds for children in the republic along with major pediatric hospitals and a great number of specialized departments for treatment of newborns and the care of premature infants, as well as 47 sanatoria and many other institutions. In the first year of the current Five-Year Plan alone, 7 new major pediatric hospitals in Tashkent, Margilan and many other cities and rayons of the republic accepted their first patients. In many cities, new gynecological consultation units were opened, as were delivery homes. In 1979-81 alone, local agencies assigned 84 buildings to health care, among them various institutions for the care of women and children.

The UzSSR Ministry of Health, in implementing measures for the further raising of the level of medical care to mothers and children in the city and in rural areas, took into consideration the unique conditions under which a portion of our rural children live. Other such facts are the distribution of children in the republic. These facts determined the specific organization of health care for rural children.

The UzSSR Ministry of Health took something else into consideration in equalizing the level of medical care in rural areas with that in urban areas with respect to gynecology and pediatrics: the special circumstances of some rural children, their geographical distribution and other features of public health organization for rural children. We have already made clear progress: Bukhara Oblast has established positions for pediatric physicians in rural physician-staffed outpatient clinics, a new type of organization in rural district service. In Samarkand and Andizhan Oblasts, nurses were employed in units staffed by medical assistants and midwives for the observation of infants up to one year old. In Fergana Oblast, units of this type were reinforced, making possible concentration of medical cadres. As another innovation, specialized pediatric brigades for emergency care of children and selection of special transportation facilities for delivery homes in order to drive newborns and their mothers home again have been introduced. Pediatric districts have been broken down, the home-nursing system has been improved etc. More than 5,000 Uzbek women have at least 5 children. As experience has shown, many of them are unable to get away from their children, especially the young ones, to receive necessary medical treatment in time. Thus, "Healthy children - with healthy mothers" sums up one of the basic contemporary goals of the UzSSR Ministry of Health. With the goal of implementing this most important public mandate, utilizing the help of oblast and rayon CP agencies, our republic became the first in the country to organize special "Mother and Children" hospitals or departments for treatment of women in pediatric hospitals. Thanks to this program, more than 70,000 mothers annually in Uzbekistan recover their health at a facility with sick children.

The sanitary-epidemiological service occupies a leading position in the public health of the UzSSR. The selfless labor of its workers has made possible far-reaching reversal of the negative effects of the rapid development of a many-sided industry in the republic and the widespread changeover of local agriculture to chemical methods. Complex measures in the sanitary and hygienic, anti-epidemic, therapeutic and preventive areas were designed and successfully carried out; this helped to significantly lower the rate of infectious diseases. It was thanks to the perceptible help of the sanitary-epidemiological service in the UzSSR in protecting its citizens' health that transmission of a number of especially dangerous infectious diseases from countries bordering the republic was halted. The large-scale objectives of the sanitary service of the republic have constantly demanded new working methods. Truly, the scientists and practicing physicians of Uzbekistan have developed a new sanitary/epidemiological method--centralization of administration and financing, which has been acknowledged and disseminated throughout the Soviet Union.

The development of the material and technical base of the pharmacy service in the UzSSR, the improved training of pharmaceutical workers and the expansion of their work has made possible complete satisfaction of the demand for many special pharmaceuticals by the population, especially for cardiovascular and cancerous

diseases, diabetes mellitus and tuberculosis and so on. In 1978, we organized a specialized sovkhoz to grow, process and package medicinal plants.

In recent years, according to a guideline from the UzSSR Main Administration for Medical Technology, a plant for assembly and repair of medical equipment has been established as a basis for producing nonstandardized equipment and low-mechanization instruments for medical workers. Seven "Medtekhnika" dealerships with storage facilities have been constructed. Sites for organizing 108 additional "Uzmedtekhnika" dealerships have been planned by ispolkoms.

In order to keep medical workers informed, demonstration expositions for instruments and apparatus of the newest types are held almost annually (in 1977, an exposition of modern technology from capitalist countries was organized with participation of over 60 companies; in 1979 members of COMECON put on a demonstration of modern medical technology from their manufacturers and those of some other countries).

Doubtless, the rational use of funds for maintenance and improvement of transportation facilities has been furthered by centralization of their sites.

Emergency mobile units have been much better equipped; almost all vehicles, for example, have radio communications for emergency runs.

Public health in Uzbekistan has been converted into a complex system of many branches including outpatient polyclinics, hospitals, pharmacies, sanitary/hygienic units and other institutions.

According to an analysis of the last few years' work, however, still greater concentrations of our effort with respect to practical health care and medical science are needed to solve a whole series of extremely important problems. The primary task is further development in the republic of preventive medicine. Basic thrusts of everyday practical medicine and continuing medical research in Uzbekistan must include isolation and, most importantly, elimination of conditions that favor preliminary stages of disease and development of diseases from them.

Implementation of the general line of Soviet public health in the 11th Five-Year Plan--preventive medicine--depends in large measure on continuing establishment of public health organizations. Having considered the republic's economic, demographic and regional features, the UzSSR Ministry of Health began working out conditions for the more rational development of care in outpatient polyclinics and hospitals and optimal norms to improve health facilities for the population.

The rapid maturation of Uzbekistan's economy in the period of socialist development brought not only greater material prosperity but also combined with improved citizen health a number of problems in medicine, for example, those connected with the construction of enterprises under difficult climatic conditions.

For example, the republic's scientist/physicians and general practitioners made a genuine contribution to the implementation of the plan during construction of the Navoi-Zarafshan industrial complex. Completely new dimensions of population resettlement and extreme change of climatic zones came about through the intensification of production and retooling of agriculture in Uzbekistan, especially in Golodnaya, Dzhizak and Karshi steppes. If we disregard certain regional differences, we observe more and more clearly the effect of a sedentary way of life, nutrition and a sometimes less than rational use of drugs etc. upon the public health indicator. Much attention ought to be paid to the present demographic situation, the increase of life expectancy and, as a result of this, a change in the level and structure of prevalence of diseases and causes of death etc. All these new factors are of course taken into account by the Ministry of Health of the UzSSR as it draws up long-term plans, especially those to develop means and methods of prevention. However, it is clear that these new problems may not be resolved merely by continuing to increase the number of hospital beds, polyclinics, outpatient clinics and polyclinic workers; they demand new approaches and the constant and active participation of the other ministries and departments.

In connection with this, it is appropriate to recall the words of N. A. Semashko: "It is necessary to conceive of prevention, not as a narrow undertaking for public health agencies, but in all its breadth and depth as the Soviet state's concern for improved health among the Soviet people."

The health care system of Soviet Uzbekistan is based on an extensive network of scientific research institutes and institutions of higher learning in medicine, the collectives of which fulfill fundamental and practical research tasks taking principal directions of medical science and therapeutics. This constant attention to solving problems in medical science allowed us to complete recently a very significant undertaking for practical health care and the further growth of medical science. It received state and republic awards and was acknowledged by literary testimonies, diplomas from the Exposition of Achievements of the People's Economies (VDNKh) of the USSR and UzSSR and other citations.

As we know, cardiovascular disease is one of the global problems in health. An interdepartmental program to combat this condition has been worked out by scientists at the Scientific Research Institute for Cardiology and is being implemented. The theory and practice of surgery are flourishing in our republic. The affiliate of the USSR Academy of Medical Sciences All-Union Scientific Surgical Center has become widely known at home and abroad through the successes of its scientists; it has a unique building and exceptional equipment and apparatus and top cadres who can carry out the most difficult surgery in the heart, vessels, liver and other organs.

One of the frontiers of science are our scientists' studies in transplantation, as well as the development of new drugs. A new trend in the study of brain inflammation is the research finding of Uzbek neuropathologists. The UzSSR Scientific

Research Institute of Oncology and Radiology is one of the leaders in the theory and practice of ultrasonic diagnostic methods for malignancies. With the application of research results for Uzbekistan's phthisiologists, an anti-tuberculosis network has been improved and its work singled out for recognition throughout the Soviet Union. In the UzSSR, some parasitic diseases have been stamped out and the incidence of others has been lowered. The experience of the republic in this area has attracted the attention of our scientists and those from foreign countries. Uzbek scientists have succeeded in obtaining polyvalent, highly effective anti-snakebite serums and serum against the bite of Lathrodetus tredecimguttatus, which are used successfully in countries of the Near and Middle East. Recently, Uzbek hygienists carried out environmental protection projects based on broadly based use of scientific research. Occupational pathologists in the republic also made a significant contribution to this most important economic problem. They have developed methods for early diagnosis and rational occupational planning for the victims of pesticide intoxication and thus made possible restoration of their health. An indubitable contribution to the further growth of Soviet medicine has been made by our dermatologists through their development of new methods for the early diagnosis of venereal disease, by traumatologists who found new methods of conservative and operative treatment of a number of orthopedic deformations, by ophthalmologists who previously conquered trachoma and now work with success to lower incidence of glaucoma, endocrinologists, who have solved a number of complex problems in the pathogenesis and clinical treatment of thyroid pathology, gastroenterologists, who established the regional distribution of a number of very important disorders and worked out methods to treat them using diets composed of national dishes, pharmacologists who synthesized highly effective drugs and many other specialists.

In addition, the scientists of Uzbekistan have made no small contribution to basic medical fields. The original theories of mechanisms of adaptive reactions, findings on the uptake and transport of protein by the kidney cells and new aspects of the pathogenesis of toxic hepatitis, among other discoveries, have obtained international recognition.

The labor, professional skill and accomplishments in medical theory and practice shown by Uzbek medical specialists - multiplied many times by the great achievements of the socialist structure of the Land of Soviets - is the real basis of our progress and the basis of worthy fulfillment of the Party's plan to protect the chief treasure of the Union of Soviet Socialist Republics - the health of the Soviet people.

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CSO: 1840/322

HEALTH CARE ACHIEVEMENT OF KAZAKHSTAN

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 12, Dec 82
(manuscript received 14 Jun 82) pp 27-32

[Article by KaSSR Minister of Health M. A. Aliyev: "The Achievement of Public Health in Kazakhstan"]

Our republic has marked a glorious observance, that of the 250th anniversary of the voluntary unification of Kazakhstan and Russia. This significant date coincided with the beginning of a new Five-Year Plan that sets forth grand plans for building communism. The achievements of Kazakhstan in all areas of the economy, education, science and culture are enormous. This is very well exemplified by public health in the republic, which began to grow at an unprecedented rate after the Great October Revolution. In 1913, Kazakhstan had only 96 outpatient clinics and 98 hospitals with 1800 beds. Only 244 physicians worked here. The life of the Kazakh people was characterized by poverty and disenfranchisement. The extreme economic and cultural backwardness of the region and the low level of medical care caused the spread of especially dangerous infections such as plague, cholera, smallpox, tuberculosis and others. There was no specialized medical aid for women and children. Kazakhstan was also without sanitary and epidemiological services. Any infectious disease at all was quickly disseminated and fatal epidemics occurred.

In the very first years of Soviet rule, thanks to Leninist national policy under the direction of the Communist Party and the Soviet government, modern public health and medical cadres developed in our republic. By 1920 the number of medical workers had grown to 1.5 times the number in 1913 and the medical institute in Alma Ata and medical schools had opened.

The Soviet reforms and the achievements of economic and cultural construction created favorable conditions for the development of public health. The republic now has over 2,400 outpatient polyclinics and 1,600 hospitals with about 200,000 beds or 131 beds per 10,000 of population.

The increase in the number of beds in inpatient units results from establishment of new, large-scale multipurpose hospitals and the expansion of existing ones.

The number of hospital beds has grown by 43,000 compared with 1970. The average capacity of oblast hospitals is 602 beds, that of urban hospitals is 214 beds and the numbers for central rayon hospitals are, in urban areas - 220, in rural areas - 177 with 35 beds on the average in rural district hospitals.

More than 49,900 physicians and more than 155,000 middle-level medical workers are employed in Kazakhstan. The figures per 10,000 of population are 32.7 for physicians and 102.0 for middle-level medical workers.

A well-organized system of public health has been established that commands a large-scale material and technical base and trained cadres and is founded on contemporary achievements of worldwide and national medical science and practice. Medical and scientific institutions are equipped with modern laboratory, diagnostic and therapeutic instruments. Highly effective pharmaceutical products are available to the population and the therapeutic and preventive institutions in sufficient amounts.

Construction was begun, in the last 10 years alone, on hospitals with a 52,200-bed total capacity and preventive and therapeutic institutions with a 45,500-visit total capacity. The latter include 28 central rayon hospitals, 11 rural district hospitals, 3 oblast-level pediatric hospitals, 9 urban hospitals, 8 maternity homes, 4 psychiatric hospitals, 40 gynecological consultation clinics and polyclinics and others. Capital investments for their construction totaled 480 million R. Besides capital investments, additional sources of funding were drawn on: increased contributions from kolkhozes and sovkhozes and other organizations and enterprises. The growing appropriations for health care formed the economic basis for improving the medical services available to the population. The capacity of outpatient polyclinic care increased, with physician visits growing in number to 11.3 per capita in cities and 5.4 per capita in rural areas. The quality of outpatient polyclinic care is improving and the discipline and organization of their work is being tightened. Regional therapeutic and pediatric units are being expanded and supplied with physician cadres. There are 2,213 persons to one regular position for a uchastok internist and 888 persons to a uchastok pediatrician. Seven hospitals providing emergency medical care have been organized. Workers in industry, construction and transportation are provided with medical care. A medical and hygienic network has been developed and there has been growth in the number of plant physician units, more than half of which have been turned into territorial polyclinics.

Cardiology, oncology, ophthalmology and narcology, as well as other forms of specialized care have undergone intensive development.

Special attention has been devoted to medical aid for cardiovascular patients. Plan goals for cardiologic services are being fulfilled. The number of cardiological consultation units that have been established is 129, 24 of them in rural areas. There have been 41 cardiological brigades organized and 3,250 beds for heart patients in institutions. In Karaganda, one of the first cardiological clinics, with 180 beds, has been opened. A cardiological preventive dispensary with a polyclinic department has been organized in Alma-Ata.

Stomatological care is now more accessible and on a higher level. The basic thrust of its development and improvement has been organizing large-scale stomatological polyclinics and extending the training of cadres in stomatology. A network of stomatological polyclinics has been set up and equipment in this field has been enhanced by modern diagnostic and therapeutic apparatus and instruments. Acceptances to the faculty of stomatology have grown and such a faculty has been instituted at the Karaganda Medical Institute.

In many therapeutic institutions in Kazakhstan, a method for hyperbaric oxygenation is being adopted. The "artificial kidney" apparatus for chronic hemodialysis is found at six institutions. Kidney transplantation is carried out in the republic; radioisotopic diagnosis is also performed.

There are 58 functioning departments of resuscitation, 18 of which are at oblast hospitals, with 18 in cities and 6 at hospitals for emergency medical care. At present, all rayon centers have departments for emergency and urgent medical care and there are plans to open independent stations on this basis.

A number of specialized centers has been organized in the KaSSR: pulmonological, cardiological centers, organ and tissue transplant centers and centers for the treatment of allergy, gastroenterological disorders, pediatric surgery etc.

Rural health care has seen widespread improvement. Specialized expert medical care has become available to the rural population. The country nears the city as far as the level, quality and volume of medical care are concerned. Today the rural inhabitant receives medical care in 12-17 medical specialties and is tended by well-trained specialized medical personnel within the boundaries of his administrative and territorial rayon. To bring medical aid to the population of far-flung rayons and workers in remote animal-raising areas, mobile physician-staffed outpatient clinics, fluorographic installations, consultation clinics for women and children, airborne medical units and also regular and urgent travel by well-trained specialists have been organized.

Each year over 1700 young specialists go to rural areas, representing the more than 50% of KaSSR higher-education entrants who come from the country.

Almost all rural uchastok hospitals and outpatient clinics are staffed by physicians, provided with instruments and apparatus and outfitted with sanitary motor vehicle transportation. A number of measures has been taken to strengthen the bases of rural therapeutic and prophylactic institutions and build new ones. Only in the past 10 years, 487 rural physician-staffed outpatient clinics have opened. The equalizing of rural and urban care is accomplished by the creation of 60 interrayon specialized departments with a central rayon hospital as a basis. Gynecological outpatient and polyclinics give care at 736 locations, 434 of which are in rural areas.

Many rural hospitals are equal to urban clinics in capacity and apparatus. Medical students, physicians, physicians' assistants, nurses and laboratory technicians keep watch over the health of all areas of agricultural labor during the travail of harvest. It is possible to see medical workers everywhere that the fate of Kazakh bread is being decided during harvest-time..

As a symbol of the Party's constant concern for the oncoming generation, the material and technical basis of pediatric and obstetric institutions is constantly developing as are sanatoria and children's homes. Many of them will be rebuilt wholly or in part. Pediatric therapeutic and prophylactic as well as obstetric institutions will be outfitted with the necessary equipment. Dairy kitchens are being opened.

Maternal and child health continues to be better guarded. Prophylactic care among children and pregnant women is joined with dispensaries; specialized maternity homes and departments of obstetric pathology and pediatric departments have been organized including those for newborns with care for premature infants, resuscitation and intensive care units.

Measures have been taken for the sanitary and epidemiological well-being of the Kazakh population. The state's watch over environmental protection has been more sharply focussed and it sees to rational use and reproduction of natural resources. Expenditures for these purposes from the state budget have grown. A number of measures to eliminate infectious diseases have been carried out. The population's needs for medical institutions and pharmaceuticals has been more completely met and ways and means of pharmaceutical institutions have been perfected. There is an expanded network of pharmacies; delivery of medical technology has increased.

Trained health-care cadres are being educated at institutions in the republic. In addition to traditional specialties: surgery, therapy, gynecology and obstetrics, ophthalmology, dermatology including venereal pathology, there has been extensive development of more complex modern specialties in allergy, cardiological, pulmonological, neurological and oncological areas as well as others. The training of physician and scientific cadres has proceeded apace. The territory, where there was no higher institution of learning before the revolution, now has six medical institutes. Alma-Ata has an institute for physician advanced training and an affiliate of the medical institute was recently established in Chimkent. The base for improvement of physicians' qualifications has been broadened. A faculty for advanced training has been opened in Aktyubinsk. It is planned to open such a faculty at Karaganda Medical Institute. A system for improving qualifications of middle-level medical personnel is being worked out.

A network of scientific research institutes and central scientific research laboratories belongs to the health-care system. The academic medical council of the KaSSR Ministry of Health administers scientific and research activities by physicians; 14 problem-solving commissions with leading medical academics of different specialties take part in this process.

Research in almost all contemporary directions is being carried on, including new therapeutic and scientific branches: immunology, transplantation, biotechnology, medical genetics etc. The basic research done by Kazakh scientists on a number of problems has become well-known both in our country and abroad.

The research done on the lymph circulation represented a great step forward for that time in physiology. The study of molecular biology of the influenza virus led to conclusions that contributed greatly to current theory. Deep study has been devoted to tumor epidemiology, methods of treating oncological disease by radiation have been perfected and thus more effective therapy has been made possible. Kazakh scientists were the first to study brucellosis and they proposed methods for its prevention and techniques to cure it. The work of occupational pathologists has received widespread recognition, especially their highest-priority areas of lead and chrome toxicity. Our scientists were among the nation's first in working out techniques of ocular microsurgery. Nutrition studies have not only served medical science but as the basis for the state Food Program.

A precise system for translating scientific discoveries into therapeutic practice has been created.

As a result of efforts by medical scientists, there has been a significant reduction in infectious diseases, especially among children and maternal and child mortality has dropped. There has been significant improvement in the population's health. At the largest worldwide health-care conference in history, in 1978 in Alma-Ata, we spoke convincingly, as our foreign delegates attested, using Kazakhstan as an example, on the advantage of socialist public health.

The importance of Kazakh research is attested to by regional scientific centers working with WHO, the selection of Kazakh scientists for the staff of the USSR Academy of Medical Sciences and the KaSSR Academy of Sciences as well as the number of honors they receive from the KaSSR. Medical scientists in the republic constantly carry on consultative and therapeutic work, traveling to oblast, rayon and rural hospitals.

"Basic directions of economic and social development of the USSR in 1981-1985 and in the period up to 1990" was the designation for the chiefs paths of progress taken by the health-care system. Here, improvement of the level and quality of medical care for the population is provided as well as the further dispersement of the network of institutional health care; improvement of its structures, rational location, better provision of health-care institutions with pharmaceuticals, instruments, medical technology and equipment, supplies, transportation and communication devices. The further improvement of the organizational and economic activity at health-care institutions deserves the deep attention of workers at oblast, municipal and rayon agencies. Much must be done to improve the effectiveness of repair and construction work at medical units. The activity of medical transport must be enhanced.

The general line of Soviet medical care has been and remains its prophylactic direction. The prevention of diseases, hygienic education and the shaping of a healthy way of life among the population--these are the most important tasks of Kazakhstan's entire medical system. In order to carry them out, basic health-care resources must be utilized more rationally: medical cadres, material and technical basic services and budgetary appropriations.

To increase the efficiency of outpatient and polyclinics for rural residents and workers in distant regions of animal husbandry, the mobile physician-staffed outpatient clinics will receive greater use; there will be more traveling physician brigades, sanitary aviation and specialized consultation offices and laboratories (for stomatology, roentgenology, fluorography, clinical medicine, diagnosis and other areas). There are plans to increase the network of physician-staffed outpatient clinics and organize such a clinic in every settled point of 1000 population and over.

There will be further development of oncological, psychiatric, narcological and other specialized services. Especially, the development of cardiological care will be singled out in that the network of cardiological dispensaries and consulting offices will be increased as will the number of specialized departments in hospitals; dispensary care will be expanded.

There are plans to build 10 oblast cardiological dispensaries in Kazakhstan in the near future as well as to organize 200 cardiological consultation offices, 100 cardiological brigades at emergency care stations for heart attack victims and over 40 cardiological departments. Travel to spas for recovery will be without charge to persons who have suffered myocardial infarction.

The material and technical base will be developed and perfected by means of rational combinations of multipurpose and specialized institutions with modernization and enlargement of existing hospitals, including rayon and uchastok hospitals. Medical education and science is to be developed further.

The goal of medical workers is to increase the chief wealth of the people--its health. In the name of this goal, Kazakh medical specialists do their work and generously give to the cause their knowledge and experience.

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CSO: 1840/322

DEVELOPMENT OF HEALTH CARE IN GEORGIA DISCUSSED

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 12, Dec 82
(manuscript received 29 Jun 82) pp 32-35

[Article by GSSR Minister of Health G. G. Lezhava: "The Development of Health Care in Georgia"]

[Text] Georgia is a land of ancient and distinctive culture. Very valuable monuments, archeological finds and documents point to a high level of knowledge and culture here even in very ancient times. We even have medieval medical manuscript tracts in which symptoms of disease and therapeutic methods are described. It is often surprising to the medical specialist of today how clearly they are conceived and with what sharp understanding the mechanism of illness is perceived. One such tract--the "Tsigin saakimoi" ("Book of healing")--was recently reissued with appropriate commentary and notes; its author was the distinguished thinker and physician of Georgia Zazoy Panaskerteli, born 550 years ago next year.

The voluntary union of Georgia with Russia was a condition of its survival as a nation; however the true florescence of Georgian culture took place only with Soviet power.

Medical care was inaccessible to a large part of the Georgian population until the Revolution. Malaria and several infectious diseases were widespread and child and childbirth mortality was high.

In rural areas there was 1 physician to every 43,000 of population and to every 7,600 urban inhabitants. Altogether, 461 physicians and about 700 medical assistants and nurses worked in Georgia, where there were 45 hospitals, 12 outpatient clinics, 37 physician and 17 medical-assistant-staffed units with one maternity home and one consultation clinic for children.

In the early years of Soviet power, protection of personal health became a task of immense importance for the state. One of the first legislative acts of Soviet Georgia was the decree on radical improvement of medical aid to the population, progress in maternal and child health care and strengthening the forces fighting epidemics. A well-organized government public health system was instituted.

By the 1940's there were 314 hospitals, 1545 outpatient polyclinics, maternity homes, child and female consultation clinics. If there were 6 private sanatoria here before the Revolution, now the number of state and trade-union sanatoria,

rest homes and pensions has grown to 122. At present there are 49.6 physicians to every 10,000 of population and they represent all specialties; there are 114 middle-level medical workers to every 10,000 persons.

The state devotes an immense and annually increasing amount of money to health care. Today these appropriations make up over 14% of the republic's budget.

In Georgia today there are hundreds of medical institutions equipped with modern apparatus and employing highly trained specialists. In the 9th and 10th Five-Year Plans alone 160 therapeutic and prophylactic institutions were constructed or reconstructed. A significant part of the hospitals were multipurpose specialized inpatient hospitals with polyclinics which represented large-scale architectural complexes designed in contemporary style, with all conditions met for practical and theoretical medicine. By the close of the 11th Five-Year Plan, there are projections for the establishment of a number of multipurpose hospitals.

During the years of Soviet power, thanks to the development of a sanitary epidemiological service, many infectious diseases have been altogether eliminated. An extensive network of medical institutions was expanded thanks to specialization of medical care. At present, there are all essential branches of clinical medicine in Georgia: therapy, pediatrics, physical therapy, urology and nephrology, oncology, ophthalmology, neurology, psychiatry, cardiology, allergology, endocrinology, pulmonology, gastroenterology, orthopedics and traumatology, vascular and thoracic surgery, microsurgery etc.

General and specialized medical care for mothers and children is the object of very great attention. There are 194 consultation clinics for women, 422 pediatric polyclinics or departments, 269 maternity homes or departments staffed by obstetricians and gynecologists, 25 pediatric hospitals, scientific research institutes for pediatric medicine and generative human functions imeni I. F. Zhordaniya and for perinatal medicine and OB and gynecology imeni Academician K. V. Chachava. Recently a Pediatric Rehabilitation Center was opened in Tbilisi and a new pediatric hospital with 600 beds was opened.

One of the main tasks of public health, that of equalizing urban and rural health care, is being accomplished. In Georgia the population of each remote settlement is provided with medical care and in the center of each rural rayon there are multipurpose hospitals and polyclinics and a maternity home or ward where new methods of examination and treatment are employed. Sanitary aviation has been widely developed. Well-trained specialists travel to the republic's cities and rayons at any time of day, in any season for consultation and treatment. In the 11th Five-Year Plan, new medical institutions will be built in almost all rural centers, including hospitals and maternity homes.

Georgia has become a health center for the entire Soviet Union as a result of the study and use of the richest nature resources and mineral reserves of the republic. There are several hundred health spas here. In sanatoria with sound

buildings and modern equipment, healing is experienced by persons with cardiovascular, peripheral nervous system and motor disturbances as well as non-specific nervous disorders and digestive complaints.

There are a medical institute and an institute for advanced training of physicians, as well as an extensive network of middle-level medical training institutions.

Medical science has grown up in Georgia in the Soviet period; its achievements are famous beyond the boundaries of the GSSR and the Soviet Union. In numerous scientific research institutes in the medical field, in departments of higher institutions of medical education and in specialized medical centers, medical specialists study cardiovascular pathology, malignant tumors, leukemia, basic nervous and mental illnesses, epilepsy, scientific foundations of maternal and child health, occupational medicine, general epidemiology etc.

Basic research on the precise structure of the brain is being carried on to understand normal brain functioning and that in various pathological conditions leading to synarchitectonics and the theory of the reversibility of neuronal injury. At present this research is carried on at the ultrastructural level.

An original classification of epilepsy has arisen; studies are being conducted for the first time of pathogenetic mechanisms of epileptization of the neuron and the entire epileptic process; a system of diagnoses of different forms of epilepsy by stages and differentiated treatment of different forms of the disease are being developed. New methods of surgery for the ear and larynx and objective audiometry have been developed. The mechanisms of action of new pharmacological agents basically applicable to neuropsychic, cardiovascular and oncological disease are being studied.

Studies involving experimental construction, tests and clinical investigation in the area of creation and use of corundum ceramics for the endoprosthetics of bone tissue have been done and the first successful operations accomplished. At present work is being done in the use of corundum ceramics for endoprosthetics in stomatology, ophthalmology and otorhinolaryngology in addition.

There is great promise in research showing the fundamental possibility of using artificial blood for conservation of the heart and kidneys with and without perfusion; in methods of hypothermal perfusion of kidneys from newborn donors for anastomosis of vessels in transplantation in order to protect the organs from ischemic injury.

Perinatology has been advanced and new methods suggested for using different information from the fetus during delivery. Modern methods of diagnosis and treatment of acute myocardial infarction patients are still being developed and established; this is leading to a reduction in the mortality rate of this disease. The toxicological and mutagenic activity of several pesticides is being studied, recommendations for improvement of occupational hygienic conditions in different branches of industry are being studied, as are agricultural conditions and traumatology.

Only in recent years have we come to study such effective natural healing agents as the microclimate of karst caves, the hydromineral resources of the republic's mountainous areas and the mineral springs of Lashichal, Mitarbi, Vardziya etc.

A number of original apparatus and mechanisms has been invented: cryomicroscopes, cardiostimulators, catheters for extended transfusion, microchannel ionometric probes, orthopedic mechanisms, computer-aided thermographs, apparatus for renal hypothermia, a balloon pump for balloon catheterization of patients with acute heart failure etc.

In the fields of medical biophysics and genetics, transplantation of organs and tissues, epidemiology of noninfectious diseases using mathematical methods, the research of our medical scientists is well-known; informational retrieval systems are being set up.

The GSSR has frequently been the location of scientific meetings of medical scientists. In recent years alone, using the scientific research institutes of the GSSR Ministry of Health, a number of symposia on schizophrenia, pneumatology, chemotherapy of some parasitic diseases surgical treatment of epilepsy, cardiology, microsurgery etc. have been held.

The medical scientific research institutes of Georgia have extended more and more their ties to and cooperation with corresponding institutions abroad. International cooperation is most important in mathematical applications and the use of computers in medical science, hygienic aspects of environmental protection, toxicological analysis of several substances used in agriculture, evaluation of viability of transplanted organs, the epidemiology of hypertension, ischemic disease, cancer, and a number of others.

In the years of Soviet power, health care and medical science in Soviet Georgia have made truly gigantic advances. The decisive role herein has been played by the Communist Party and the Soviet government in giving their attention to the protection of the health of the population and, as well, by the close creative connections between medical workers of all the republics.

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ACCOUNT OF PROGRESS IN PUBLIC HEALTH IN LITHUANIA

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 12, Dec 82
(manuscript received 17 Aug 82) pp 35-40

[Article by LiSSR Minister of Health I. I. Platukis: "The Progress Made in Health Care by Lithuania"]

[Text] In observing a glorious anniversary of our country - the 60th year since the formation of the USSR, we draw conclusions from all work done in Lithuania in the years of Soviet power. Great meaning for the Party's and government's health-care goals is to be attributed to the decree of the CPSU Central Committee and the USSR Council of Ministers "Measures for Further Improving Public Health". It has made possible steps toward perfecting the work of key public-health links--outpatient clinics, polyclinics, dispensaries, institutions for emergency and urgent medical care; toward strengthening the material and technical base of medicine, toward expanding the capacity of massive complex prophylactic examination and dispensarization and toward improving these services. The number of hospital beds is growing according to Plan. In the last decade, an average of 1000 beds and polyclinics accommodating 2000 visits per shift have started construction and there are new sanitary and epidemiological stations, pharmacies and other health-care facilities.

At present the LiSSR has 41,885 hospital beds. Russia had only 2,180 beds in 1913 and 8,888 in 1940. Now there are 121 hospital beds for every 10,000 of population. As a significant step forward, construction was begun on the Vilnius Republic Hospital with 1000 beds and zone, municipal and central rayon hospitals were improved. In the Republic, zone and municipal hospitals specialized centers were created and new medical technology was installed. Medical care and the quality of patient services were promoted by growth in the number of in-patient beds, the expansion of hospitals and the organization of high-quality, specialized centers. Priority in organizing hospital care is given to well-proportioned development of a network of hospitals, polyclinics, consultation clinics and dispensaries and to efficient interaction among their personnel. We are working on rural, physician-staffed outpatient clinics in which physicians practice 3-5 specialties.

Another priority is expanding and developing therapeutic and diagnostic and their accessory services and providing contemporary technology and trained cadres for their work.

Significant results have been achieved in the training of medical cadres and the staffing of medical institutions with physicians. The Kaunas Medical Institute, the Medical Faculty of Vilnius University and medical schools train medical cadres. At present about 14,000 physicians and more than 38,000 middle-level medical workers are active in our republic.

In Lithuania there were 400 physicians in 1913 and about 2,000 in 1940, while there were 2,700 in 1950. In 1913 middle-level medical personnel amounted to 600, in 1940 to 2,000 and in 1950 to 5,800. Now, 40 physicians and workers at middle-level amounting to 110.7 are available to every 10,000 of population. Starting in 1971 all physicians in therapeutic specialties who have completed an institution of higher learning go through an internship. To complete the professional training of medical cadres, 15% of all the republic's physicians are trained in every year, and if interns are added, this figure grows to 19%. There are efforts to improve the qualifications of organizers of public health in the LiSSR, especially in administration and health-care economics.

Physician education is important since a medical degree alone is of minimal value today given the necessity of psychological awareness in the face of different social problems. Administrators of health-care institutions and Party organs strive in their localities to establish as the norm for our medical workers a spirit of collectivism, harmony, the interests of personality and society, respect for work and humanism.

Measures are being carried out in order to create conditions for original work, strengthen its collective nature yet also nurture initiative. Only if we are concerned every day for the physician's advance in knowledge, breadth of horizon, moral progress and loftiness of thought can we raise the level of his work.

Creative initiative is being developed among medical workers. The number of inventions, proposals for rationalization and research projects carried out not only by scientists but also by practicing physicians is growing. Medical science plays an increasing role in resolving practical tasks in health care.

The scientists with medical training in Lithuania make a major contribution to the resolution of these problems. Cardiovascular research is in the forefront along with the investigation of cancer and environmental conditions. We must mention that these scientific directions are traditional in Lithuania.

At present, a vanguard of investigators is carrying on scientific work in Lithuania. Outstanding cardiologists are studying hypertension, atherosclerosis and coronary heart disease (Academician of the USSR Academy of Medical Sciences

Professor Z. I. Yanushkevichus, Professor L. Z. Lautsevichus), cardiac arrhythmias and defects (Professors A. I. Lukoshevichyute, A. I. Smaylis and Yu. Yu. Rugenius), cardiac electrostimulation, surgical treatment of patients with congenital and acquired cardiac defects and coronary insufficiency (Corresponding Member of the USSR Academy of Medical Sciences Professor Yu. Yu. Bredikis, Professor A. M. Martsinkyavichus). Research is carried out with the Kaunas Medical Institute as a base (Rector: Academician Z. I. Yanushkevichus) supported by the Scientific Research Institute for Physiology and Pathology of the Cardiovascular System at this institute (Director: Professor I. N. Bluzhas) and the Kaunas Medical Institute's Kaunas Clinic as well as the Vilnius Scientific Research Institute for Experimental and Clinical Medicine (Director: Professor A. A. Matulis), where rheumatism is studied and at the medical faculties of Vilnius University imeni V. Kapsukas, the scientific research laboratory at the medical faculty with a surgical profile, the Republic Clinical Hospital of Vilnius and the Laboratory of the Lithuanian Republic Council of Administration of Trade Union Health Resorts.

Lithuanian cardiologists have improved the quality of diagnosis of life-threatening conditions, perfecting and establishing in practice a number of diagnostic instruments (mounted systems, intracardiac zones, electrocardiostimulators etc.). Progressive methods for medical data processing have been introduced (mathematical methods for express diagnostics, administration of treatment and prognosis, automated diagnostics). In Kaunas a model has been created for a unified system of treatment for ischemic heart disease that makes possible uninterrupted primary preventive care, early diagnosis, inpatient treatment, rehabilitation and secondary preventive care. These measures have made it possible to lower the rate of sudden death as well as the hospital mortality of myocardial infarction. More than 80% of the myocardial infarction patients in Kaunas return to their regular occupation where they receive systematic rehabilitation.

Prosthetic heart valves are in common practice in Lithuania and reconstructive surgery is carried out in the thoracic and ventral aortas, the coronary arteries and the peripheral vessels.

The growing incidence of death from cardiovascular conditions points to a need for increased work in cardiology. The mortality from these conditions cannot be lowered unless a system of preventive care is developed. Of special importance are studies of the epidemiology of heart disease carried out, according to the program of the World Health Organization, at the Scientific Research Institute for the Physiology and Pathology of the Cardiovascular System of Kaunas Medical Institute. There are plans for the further perfecting of epidemiology, rehabilitation in all stages of heart disease and standardization and unification of methods in observation and evaluation of cardiac therapy.

The field of rheumatology is one in which much has been accomplished. The Scientific Research Institute of Experimental and Clinical Medicine has played a basic role in its study. The immunological aspects of the pathogenesis of rheumatism and other collagenous diseases, questions on clinical electromyography, rehabilitation of patients at spas in Soviet Latvia, are being successfully studied.

Work in oncology has been based on early diagnosis, improvement of preventive dispensarization. Electroroentgenography, electroroentgenoscanography, contact microscopy (including contact luminescent colpomicroscopy, etc.) are used extensively in diagnosis. Surgical treatment of tumor-related diseases is constantly being perfected (Doctor of Medical Sciences P. I. Norkunas).

The Scientific Research Institute for Oncology plays a leading role in Lithuanian oncology (Director: Doctor of Medical Sciences L. A. Gritsyute). The basic direction of the institute's work is the synthesis of new antineoplastic drugs with the investigation of their toxicity, antineoplastic efficacy, pharmacodynamics and chemotherapy along with early diagnosis of cancer and its treatment and the improvement of electroroentgenography. In the context of the Council of Mutual Economic Assistance, the institute coordinates work on the use of electroroentgenology in oncology. The work of cardiologists and oncologists in the republic has been honored with the USSR State Prizes.

Protecting the health of women, mothers and newborns is a very important field. The Kaunas Medical Institute's Chair for Obstetrics and Gynecology (Professor V. M. Sadauskas) investigates the state of the fetus in the presence of serological conflict as well as the pathology of pregnancy and extragenital diseases. Among the modern methods used to evaluate fetal status are multitest investigation of amniotic fluid obtained through amniocentesis after accurate determination of the placenta's location by means of ultrasound or radioisotopy. New investigational methods put into practice include rhythmography direct and indirect electrocardiography and monocardiography of the fetus etc. Analysis of the data thus obtained underlies a method for identifying the high-risk fetus group during pregnancy and establishment of the criteria on which hypoxia or injury to the fetus is determined and which indicate the stage of fetal maturity -- making possible a delivery that is optimal in modern terms. A system has been developed for observing pregnant women and those giving birth in view of risk factors as well as the newborn. State-of-the-art methods are employed to treat pathological conditions: electrostimulation of the uterus, decompression and bilirubin phototherapy etc.

Some progress has been made in diagnosis of disorders of female fertility and their treatment. There have been promising studies in ovarian function and that of other endocrine glands and the Fallopian tubes by means of determining electrical, biochemical and physical parameters of the cervix when menstrual disorders or infertility occur. Original apparatus, genetic studies, colposcopy, laparoscopy and hysteroscopy are used in these cases. A method for diagnosis and treatment of infertility has been developed on the basis of this research.

Particular emphasis is placed upon the further development and perfection of qualified specialized medical care for women and children. All problems in this field are attacked in cooperation with other ministries and departments and other public bodies. Specially mixed foods are used to adjust the diet of children.

Indicators in preventive medicine for women and children improve from year to year. On the average about 98% of expectant mothers and 95% of newborns are covered by home care; children up to one year old are observed uninterruptedly at the rate of 99%. A system for treatment of pregnant women with high risk factors and observation of them is part of the gynecological consultation clinics. This system is also applied in pediatric polyclinics for observation of newborns and their treatment. Medical care has been made as accessible as possible to rural children for prophylactic purposes, facilitating constant monitoring by physicians of these young persons. One of the primary tasks of health-care agencies in the LiSSR is developing and perfecting dispensary care for children, especially in the country and better organizing specialized care given them and women.

Scientific research work is being focused on other problems, especially at certain chairs in medical institutions of higher learning. In neurosurgery (Professor L. A. Klumbis), treatments for hyperkinesia and aneurism of the cerebral vessels have been developed. Professor P. I. Norkunas created an independent school of Vilnius surgeons. There has been successful kidney transplantation at the clinic (Docent V. Yu. Kleyza). Scientific workers of the republic achieved certain successes in the study of allergies (Professors B. I. Padegimas and B. I. Vasiliuska), stomatological disorders (Professor S. P. Chepulis), children's growth disorders (Professor S. V. Pavilonis) as well as gastroenterological (Professor M. I. Krikshtopaytis) and pulmonological diseases (Professors P. A. Shnipas, A. I. Zhyugzhda and Yu. L. Gamperis).

Environmental problems with their implications not only for health but also for the economy, are studied at the Scientific Research Institute for Epidemiology, Microbiology and Hygiene (Director: Candidate of Medical Sciences S. V. Gurchinas) and chairs of the medical faculties of Vilnius University and the Kaunas Medical Institute.

Health risks are continually observed and evaluated. Undesirable genetic mutations transmitted from one generation to the next that are evoked by chemical substances and physical changes, including the effects of drugs, are a very urgent question at the moment. The growth in the number of persons using drugs unsuitable for them is a very dangerous tendency with which physicians have not yet come to terms.

There has been reinforcement of the material technical base of institutions devoted to sanitary and epidemiological work, which occupies a special place in health care, and establishment of a number of linked laboratories for sanitary epidemiological work with improved cadres and equipment. Annual reviews of sanitary conditions with participation by community and health-care leaders are conducted to improve the hygiene of rural rayons, kolkhozes, sovkhozes and farms. Every year the three rayons with the best sanitary indicators are awarded the Red Challenge Banner and monetary prizes. These measures contribute greatly to an improvement of living conditions and a reduction in infectious disease in the country. Community inspections of sanitation and esthetics are carried on at the microrayon and settlement levels.

As part of the increasing effort to protect the environment, the principles of pesticide filtration through sandy soil have been studied so that maximum concentrations of basic groups of these chemicals in surface water used to replenish underground waters have been established. These data are included in hygienic requirements for construction and exploitation of infiltrated water supplies with a system of artificial replenishment of underground water by surface water. Study has been devoted to the dissemination of bacterial aerosols in irrigated cultivated fields in relationship to meteorological conditions and the type of sprinklers used. Sanitary zones of protection have been established on the basis of the research results.

Study has also been devoted to the principles of purifying nonindustrial sewage in biologically acidified stabilized reservoirs under climatic conditions of the LiSSR, taking into account sanitary chemical, virusological, bacteriological and helminthological indicators. Research data are used to prepare methodological recommendations on exploitation of reservoirs.

Risk factors in the occupational environment of assemblers in the instrument-building industry have been identified; their toxicity and the stage of lead intoxication at a given workplace have been established. Practical recommendations to make the occupational environment more healthful have been made and implemented.

The epidemiological situation and etiological structure of salmonellosis in the LiSSR has been studied and bone meal found to be very important in its dissemination. Study has been devoted to the disease's clinical and immunological characteristics and prophylactic measures worked out on the basis of the research results.

Other investigations have yielded new data on the presence of antibodies to virus of lymphocytic choriomeningitis in high titers in serum and cerebrospinal fluid of child hydrocephalus patients and in low titers in these children's mothers. These data permit the conclusion that the lymphocytic choriomeningitis virus is transmitted through the placenta from mother to fetus and participates in the etiopathogenesis of congenital hydrocephalus.

There have been studies since 1959 in Lithuania on the influence of gamma-globulin on infectious hepatitis. The introduction of gamma-globulin in the pre-epidemic season has since been approved both at home and abroad. Furthermore, different methods of introducing this agent have been developed and its dosage has been set in relation to the level of morbidity.

The instillation of gamma-globulin into the conjunctival sac represents a basically new method that is suitable for large-scale use and also facilitates economical use of expensive gamma-globulin, and by-pass of the syringe method.

Study of blood preparations has been introduced as a method to diagnose rapidly meningococcal infections. The Lithuanian sanitary-epidemiological service ought to join with practicing and research medics to make a major contribution in the development of an integrated program of prevention of the most widespread diseases.

Our most important tasks are the continued perfection of the work of the key links in health care, the strengthening of the whole system of preventive work, the search for interior resources for improving therapeutic and prophylactic efforts in rural areas and the further reinforcement of the tie between medical science and practical medicine. The republic's medical specialists do not give grudgingly of their powers to fulfill these tasks.

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CSO: 1840/322

RURAL HEALTH CARE IN KIRGHIZIA

Moscow SOVETSKOYE ZDRAVOKHRANENIYE in Russian No 12, Dec 82
(manuscript received 22 Jun 82) pp 47-49

[Article by KiSSR Minister of Health O. T. Turgunbayev: "Rural Public Health--a Constant, Never-Abating Concern"]

[Text] The resolution of the May (1982) CPSU Central Committee Plenum and the decree of the CPSU Central Committee and the USSR Council of Ministers "Measures for the Further Improvement of the Dwelling, Social, Everyday and Cultural Living Conditions of the Rural Populace" emphasizes that the social reconstruction of the countryside is a very important task of the entire government and nation. Here a major role is played by public health, which is obliged to improve medical care significantly for the rural population. Two of the basic thrusts of this improvement of medical care in the KiSSR, as in the whole country, are specialization and centralization.

The difference among valley, foothill and mountainous regions in population density, the high birthrate, the large percentage of children in the total population and the predominance in agricultural production of animal husbandry in distant pastures all affect the course of public health in the republic.

Thanks to an improvement of the rural population's standard of living and the transportation and communications infrastructure, a new approach is possible to the use of cadres and material resources for health care to provide maximum enlargement of existing facilities or construction of new ones along model plans.

From 1960 to 1980 the average capacity of central rayon hospitals grew from 97 to 280 beds, with an average capacity at present of 272 beds (rural settlements) and 330 beds (urban areas) respectively. The capacity of uchastok hospitals grew from 23 to 51 beds. The average number of beds in the republic's uchastok and rayon hospitals exceeds that of the Soviet Union as a whole because beds in rural institutions are occupied at a higher annual rate in Kirghizia than on the average in the USSR.

At present, the republic has no uchastok hospital without a physician and all outpatient clinics designated as physician-staffed are actually so supplied. As a rule, 2-4 specialists see patients in each of these; in polyclinic departments of central rayon hospitals, the number is 16-20.

Specialized departments have been created in rayon hospitals because their capacity has increased. If necessary, more highly specialized departments of oblast and republic hospitals and scientific research institutes are called on to supplement the medical care given there.

The number of physician-staffed outpatient units has increased in order to make medical care more accessible and bring it closer to the rural population of high-mountain and far-flung settlements and workers in distant locations in animal husbandry. The number grew from 22 to 36 between 1970 and 1980, while the number of units staffed by medical assistants and midwives grew from 670 in 1970 to 905 in 1980.

In distant pastures there are 22 uchastok hospitals whose material-technical and personnel supply receive constant attention. As seasonal shifts occur in the number of animal caretakers on respective winter and summer distant pastures, energy and funds of health-care institutions located in remote winter pastures shift accordingly. Summer pastures are the site of temporary and movable uchastok outpatient units and units staffed by medical assistants or midwives.

The network of rural health-care institutions is fleshed out by movable outpatient clinics, traveling gynecological and pediatric consultation clinics, stomatological groups with dental technology laboratories, groups for fluorography, inoculation brigades etc. Sanitary aviation for remote consultation is aided by oblast and republic hospitals. All this has made possible, on the one hand, a 15-20% increase in medical care for the population occupied in animal husbandry and, on the other, continuity in the health-care organization.

By 1970, the problem of stationary obstetrics had been solved by maternity wards in uchastok hospitals, kolkhoz maternity homes and rotation of maternity beds in units staffed by medical assistants and midwives. At the same time there was a strong thrust toward centralization of obstetrics in the maternity wards of major rural hospitals where all the necessary requirements existed for modern, state-of-the-art obstetric care. As a result, the number of maternity beds in rural locations grew from 941 to 1,995. Obstetrics was completely centralized in 4 rayons with a high population density and a mobile network with telephone connections was established. In 7 rayons, maternity wards equipped for observation were established.

It has become possible, through home nursing care for pregnant women carried on by medical workers from medical assistant/midwife units, mobile outpatient clinics,

uchastok hospitals and the traveling gynecological and pediatric consultation units of the oblast and central rayon hospitals, to identify high-risk groups, arrange for early hospitalization in cases of gestation-related pathology or extragenital disease.

Children in rural areas are also cared for on a uchastok basis. However, inasmuch as about 60% of children live in a zone of activity of medical assistant/midwife units, the number of rural outpatient clinics staffed by physicians must be further increased in order to construct the re-equip units of this kind. Mobile forms of medical service are also expedient.

The number of beds for pediatric use is still below the norm for the Soviet Union. For this reason it has been necessary to increase their number in the current Five-Year Plan.

As a result of centralization, small-capacity dairy kitchens have been eliminated; in a number of rural rayons, children's food is provided from centralized dairy kitchens.

Greater and greater emphasis is being placed on stations and units for emergency and immediate medical care. From 1977 to 1981 the number of these organs of emergency medical care increased from 67 to 78; basically, the new units were in rural areas. Sanitary transport was responding to radio messages in 75% of all cases.

In 1981, there was consideration of all sides of the problem of the state and measures for improving emergency medical care in Kirghizia. The ispolkoms of the local Soviets of People's Deputies were presented with the problem of arranging the most direct possible telephone service for units staffed by medical assistants and midwives, while providing in 1982-85 a direct telephone connection between these stations and units of emergency care with State Automobile Inspection posts.

Each year, the KISSR Ministry of Health sends over 50% of graduates of the medical institute to institutions in the country, making possible an increase of physician coverage from 95.8 to 98.4%. The number of pediatricians working in rural locations has risen in this Five-Year Plan from 270 (1976) to 433 (1981).

In the Tenth and in the first year of the Eleventh Five-Year Plan, state capital investments were used to raise the capacity of rural therapeutic and prophylactic institutions to 905 beds and that of outpatient units to 1250 visits; financing from sources outside the central government has supported construction of hospitals with a capacity of 965 beds and polyclinics with a capacity of 800 visits per shift. Construction has been most intense in Omsk Oblast.

The present rate of availability of hospital beds, taking into account placement of rural patients in city hospitals, to the rural population of Kirghizia is 105.4 per 10,000 inhabitants.

However, the countryside still diverges from the city with regard to outpatient facilities staffed by physicians. In 1981 each rural inhabitant made 4.9 visits to physicians, while each urban dweller made 12.8. During this Five-Year Plan, new physician-staffed outpatient clinics are to be opened without diminishing the availability to the rural population of the present level of medical aid rendered by middle-level medical workers.

On the whole, Kirghizia is adequately supplied with physician services and hospital beds. However, there are rural regions where these indicators are either higher or lower than for the republic on the average. The organizers of health care in Kirghizia suggest measures to deal with such disproportion.

We have a rather good foundation for improving the material and technical basis of health care in rural areas. This increases confidence in our ability to carry out all measures for improvement in this Five-Year Plan in our republic, which will be a contribution of the medical workers of Kirghizia to completion of the Party's Food Program.

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CSO: 1840/322

RADIATION BIOLOGY

SAFETY OF NUCLEAR POWER STATIONS

Moscow TRUD 19 Jan 83 p 2

[Article by V. Kapel'kin, TRUD correspondent at the construction site of the Smolensk Nuclear Power Station: "And there is no radiation..."]

[Text] It seems there have been so many explanations, but people who are not associated with the work of nuclear power stations are worried: "We are glad that the station is being put into operation, but isn't this associated with some danger? In the nearby woods we are storing mushrooms and berries, moving hay. Can we continue to do so? Will we be prohibited from raising vegetables and fruits? They say that the nuclear station is harmless. But we have seen people carrying devices near the nuclear power station. They are measuring radiation and taking samples. If there is no danger, then what are these people doing? These are the letters received by TRUD. They are answered by our correspondent at the construction site of the Smolensk Nuclear Power Station.

Electrical power stations, other than hydroelectrical stations, can be recognized by their stacks. The Smolensk Nuclear Station announced itself (visible even from the Varshavskoye highway) by an attractive--white with red stripes--metallic cigar in a network of load-bearing constructions. There is no smoke or soot above it. And, after all, where would it come from, since this is not a smokestack but rather a ventilation pipe which emits purified air.

Looking backward, toward Varshavka: over the village of Yekimovichi, what hangs over the highway but a cloud of black soot--the bakery is letting out smoke at full blast. This is the true polluter!

The car speeds along the smooth asphalt to the main building. The area is strict, solemn. Full young fir trees are growing. We see the wide steps of the main staircase. We have not yet passed through the entrance turnstile, and already there is a special mood: we are entering a temple. Soon the building will become even more beautiful: a gigantic sculpture-mosaic mural will appear on the facade. Moscow artists have shown their preliminary sketches. The theme will be energy, peace, friendship of peoples.

Before going into the station's working area, it is necessary to go through the ritual of putting on special clothing. These are the rules. I follow the

example of my guide, the young engineer Yu. Merkulov. All clothing and footwear except undergarments must be left in the "clean" half of the wardrobe room, in a neat white locker. Wearing special bath-type "crossing" slippers we walk--slap, slap--through the corridor into the so-called "dirty" part. The term is extremely inaccurate. This area is also clean, like an operating room. There, in another locker, the snow-white uniform is stored: jacket with pants, accessories--cap, socks, and rather elegant footwear with a cloth top, prosaically called "bakhily".

Security here, security there. One cannot take a step without security. Those who work in the block permanently wear a packet with a photocassette on the button of their special outerwear. Those who enter occasionally are given a dosimeter which looks like a pen. But that isn't all. One must pass through a special installation, as in the airport. There the indicator shows: green light--"clean", red light--"dirty". Later on I saw these indicators even in the dining room. But the green light was always flashing.

Anyone who has not been to the block control panel has not been at a nuclear power station. It is an effective picture: a mass of instruments, buttons, graphic panels. One colleague wrote: the control panel is like the starry horizon. In my opinion there is not much similarity, but the truth is that it is hard to be an astrologer here. An electronic computer with the mighty name of "Skala" helps to control this involved complex. The chief watch engineer in computer technology, V. Ramburger, explains: "the machine not only collects and analyzes signals from ten thousand indicators, but also regulates the processes".

What minds the operative personnel must have, what a responsibility is placed on their shoulders! The station shift director M. Mikheyev nods, "Not everyone is suitable". Selection is made according to tests. Let us say, for example, that one must quickly solve this problem in his head: 25 plus 37 minus 42 divided by 5. Count, the seconds are ticking! Or you are given a sheet of paper spotted with letters. The assignment: put crosses on some vowels, for example, and underline others. Time! The test, of course, is only one of the elements of a thoroughly thought-out system of selecting and training specialists for the nuclear power station. The personnel must pass a most serious examination in order to be given access to servicing the reactor installation.

Blood pressure and pulse, as well as the psychophysical state, are monitored daily by a physician. Those who have not gotten enough sleep, are inhibited or, on the contrary, excited, are sent home. "Our worker must be alert and collected", concludes M. Mikheyev. "Sometimes seconds are lost in meditation. And if minutes are spent on this, then the most clever decision will not work out on the panel".

Of course, in the case of any deviations from the normal regime, the emergency systems are actuated automatically. But such a situation at the station is an extraordinary occurrence. Even a slight reduction in the block capacity due to someone's error promises losses numbering in the thousands due to electrical energy which is not produced.

I understand. No matter how you try to convince the ignorant person of the safety of nuclear power stations, he still wants to "feel" everything with his own hands. And not just anywhere, but in the very reactor hall itself. Well, then, let us go there too.

Here it is quiet, well-lit and cozy. I walk reverently on the shiny stainless steel floor. There, in the nether regions, the sacrament of nuclear power transformation is occurring. Metaphorically speaking, the atomic samovar is boiling, or rather around 1,700 small samovars--according to the number of technological channels of the reactor. But there are no signs of great boiling.

Clicking his "bakhily" in an everyday fashion, a radiation safety worker passes by, loaded down with instruments. On his stomach is a round plastic bellows device for taking steam samples. Oh horrors! He has stepped off the stainless steel floor directly onto the "heel" of the reactor, which is lined, like a wood paved road, with steel rectangular pieces. "You can, too", smiles the service shift director, A. Kunitsyn. With the same heartening smile he let us touch the steel pieces. The floor is a regular floor, only slightly warm. To tell the truth, I too took the words of Chief Station Shift Director D. Krivoy--that the central hall is the cleanest place in the nuclear power station--as a metaphor. I see the confirmation on the scale of the radiometer--zero radiation.

There are no people simply because there is nothing for them to do here. The atomic stokers don't have that much work to do. They load a single heat-emitting assembly and can consider that they shoveled half a railroad car of coal. This is specifically the thermal effect of the thirty-six thin zirconium assembly tubes filled with a fuel of uranium dioxide.

What is the danger? In discussing questions of safety and operational reliability of nuclear power stations, I went through all the possible types of accidents, "set into action" the elemental forces of nature and even cosmic cataclysms ("... and what if a meteor falls?"). And in every case the answer was the same: an uncontrolled chain reaction is excluded.

"And what about an earthquake?" I asked, though not expecting a serious answer.

"Of what scale? We have computed variants which slightly exceeded the theoretically possible maximal force of earthquakes of this magnitude".

The atom here is not only tamed, but is also reliably locked away in several cages, one inside the other.

It seems that the system consists only of safety systems behind which, as behind a stone wall, there isn't a shadow of danger over the personnel of the nuclear power station.

They told me a rather remarkable fact here. The background radiation is reduced from year to year around long-existing nuclear stations (not speaking of the Smolensk station, since it has just been put into operation). What is

this--a remarkable ability of nuclear power stations for reverse action, "sucking out" radioactivity? No, of course not. It is simply that after banning the testing of nuclear weapons in open environments on a world scale, the radiation background on the earth's surface is declining from year to year. Nuclear power stations are so clean that even in their microzone they do not affect the character of natural processes.

At the same time, we have discovered the secret of why thermal power stations give off much greater radioactivity than do nuclear power stations. The active elements accumulate in the organics--in the grass and trees. Burn a ton of coal, peat, get a centner of ash. The activity has nowhere to go in the latter. There you are, the concentration has increased noticeably. Even here the values are by no means dangerous, but nevertheless they are lower for nuclear power stations.

Let us stress one more time--you can swim as much as you like in the marvelous Desna, and in the wonderful surrounding areas you can gather mushrooms and berries, lie on the grass, mow it, drink milk, etc., etc.

The day is turning toward evening, and we have finally come to where electricity is being born. The machine hall. The turbogenerators are humming their continuous song, and the floor is vibrating slightly.

There are three women among the turbine shop service personnel. This is not only an argument in favor of emancipation, but also an indication of perfected production. A woman at the nuclear power station means that there are no harmful elements or overloads here.

And whom did I not see at the block? Builders! It's no secret that after actuation and reports, the contractor is left with a long list of corrections. They finish plastering, painting, and sometimes even lay the foundation of some auxiliary object. The first block here has a high degree of readiness. It seems that the construction management of the Smolensk nuclear power plant has laid down a new, very high standard for the country's nuclear builders--to submit the object in full readiness. And this too is a guarantee of reliability and safety.

It was not easy to break the tradition of leaving things for later. The battle was waged for each object, and there were over sixty of them in the starting complex. The key to the movement of "zero defects" was, as it should be, the site director and delegate to the 26th party congress, B. M. Reva. They met on hot days at the block. He was, as always, energetic, collected, but he did not look too well: his eyelids were puffy, he was pale. Everyone at the site knew that he sleeps no more than three or four hours out of twenty-four during the start-up period. His enthusiasm was contagious.

The meter in the operating block indicates a third hundred of millions of kilowatt-hours of power, which is so necessary in meeting the winter peak load. The area of the second block has already become the new center of attraction for the contractor. The block will be of the same construction as the first, but will be built faster, better, and with less expense.

UDC 576.312:577.3

ELECTRIC CURRENT MODIFICATION OF GENETIC EFFECTS OF GAMMA IRRADIATION

Moscow GENETIKA in Russian Vol 19, No 1, Jan 82 (manuscript received 4 Nov 81)
pp 64-67

GRIGOR'YEVA, N. N. and SHAKHBAZOV, V. G., Chair of Genetics and Cytology,
Kharkov State University imeni A. M. Gorkiy

[Abstract] Investigations were conducted on the effects of exposure of *Vicia faba* shoots to electric currents (3 mA, 30 min exposure) of different polarities before and after γ -irradiation (Co-60 source, 250 R dose at 1061 R/min) on the incidence of chromosomal abnormalities in meristematic cells. The results showed that electric current significantly modified the effects of γ -irradiation; the latter alone induced chromosomal abnormalities in 47.6% of the cells, with a mean of 2.88 abnormalities per cell and a fragment:bridge ratio of 7.6. Exposure of the shoots to the anode prior to irradiation reduced the number of chromosomal abnormalities by 27.3%, while exposure to the cathode after irradiation reduced the incidence by 25%. Although further studies shall be undertaken to determine which ions are important in altering the mutagenicity of γ -irradiation, it is obvious that a key mechanism involved the redistribution of ions between the meristem and the other regions of the root. References: 11 Russian.

[299-12172]

UDC 577.391:612.112.94

STUDY OF MOLECULAR MECHANISMS OF RADIATION DEATH OF LYMPHOID CELLS. PART 1.
RADIOBIOLOGICAL AND BIOCHEMICAL CHARACTERISTICS OF SUBPOPULATIONS OF MOUSE THYMOCYTES

Moscow RADIOBIOLOGIYA in Russian Vol 21, № 1, Jan-Feb 81
(manuscript received 28 Apr 80) pp 19-25

SOROKINA, N. I., FILIPPOVICH, I. V. and ROMANTSEV, Ye. F.

[Abstract] Lymphoid cells from mice exposed to γ -radiation from Co⁶⁰ were separated into seven fractions (I to VII) on the basis of density, with specific gravities of the separating fluid ranging from 1.0600 to 1.1100. Average cell diameters ranged from about 6.8 microns for I to 4.5 microns for VII. Uptake of H³-thymidine, C¹⁴-uridine and H³-lysine by the different fractions was measured. In all cases, fractions I, II and III had significantly

higher radioactivity than the other four fractions. Concentrations of total -SH, protein-SH, non-protein thiol and the ratio NPSH/PSH were measured for fractions I+II and VII. No clear trends in sulfur distribution could be documented for the two groups. An unfractionated aliquot of cells was used to study the relative mobility, for which fractions IV, V and VI had the highest values. References 25: 6 Russian, 19 Western.

[55-12027]

UDC 577.391:612.015.33:612.112.94

EFFECT OF PROTEIN SYNTHESIS INHIBITION ON DYNAMICS OF POST-RADIATION DAMAGE TO NUCLEAR CHROMATIN IN RAT THYMUS CELLS

Moscow RADIOBIOLOGIYA in Russian Vol 21, No 1, Jan-Feb 81
(manuscript received 19 Dec 79) pp 63-67

VODOLAZSKAYA, N. A. and YERMOLAYEVA, N. V.

[Abstract] Cycloheximide (CHI) and pyromycin (PM) exert a temporary inhibition of post-irradiation damage in nuclear chromatin. The title study was carried out *in vivo* to examine the relationship between the CHI and PM inhibition and the length of time the biosynthesis of protein is suppressed. The administration of PM in multiple doses of 5 mg/kg and also in a single dose of 25, 50 or 100 mg/kg did not induce any significant inhibition. CHI administered in hourly doses of 0.2 mg/kg caused an initial 50-60% inhibition in protein synthesis. CHI, administered in a single dose of 3 mg/kg, caused a stronger but more transitory inhibition. CHI, administered in 3 doses of 1 mg/kg, elicited a more stable inhibition. Apparently in rats after irradiation, the CHI causes an increase in the kinetics of DNP preparation in the thymocytes but does not permit the interphase damage of the lymphoid cells. References 9: 6 Russian, 3 Western.

[55-12027]

UDC 577.391:621.039.58:577.15

MODIFICATION OF RADIATION DAMAGE TO ACETYLCHOLINESTERASE IN ERYTHROCYTE BODIES FROM CHANGING OSMOTIC PRESSURE OF MEDIA USED DURING IRRADIATION

Moscow RADIOBIOLOGIYA in Russian Vol 21, No 1, Jan-Feb 81
(manuscript received 7 Jun 80) pp 68-73

FOMENKO, B. S., Institute of Biological Physics, USSR Academy of Sciences, Pushchino

[Abstract] Varying osmotic pressure is one of the factors which can alter the radiation sensitivity of cells. Radiation (800 Grads) of erythrocytes in a 7.4mM KCl hypotonic solution results in a 62% inactivation of ACHE. Increasing the KCl concentration to 40-160mM (isotonic) buffer decreases the deactivation

to 50%. The deactivation increases linearly with increasing radiation dosage; the rate for the hypotonic buffer, however, is about 1.4 times that of the isotonic buffer. For the isotonic solution, the maximum rate of ACHE deactivation occurs during the first four hours after irradiation. Subsequently the rate of deactivation is the same as that for unirradiated samples. The change in ACHE is probably due to changes in the membrane from the difference in osmotic pressure. Analogous data on the influence of radiation on the conformation of enzymes using thermoinactivation models support the conclusion that most of the inactivation occurs shortly after irradiation. References 15: 2 Russian, 13 Western.
[55-12027]

UDC 577.391:661.879:576.809.7

IMMUNE REACTIONS IN MICE AFTER LONG-TERM IRRADIATION

Moscow RADIOBIOLOGIYA in Russian Vol 21, No 1, Jan-Feb 81
(manuscript received 4 Feb 80) pp 91-96

KIRILLOVA, Ye. I. and MUKSINOVA, K. N.

[Abstract] The numbers of platelet-forming cells (PFC's) and rosette-forming cells (RFC's) were monitored for 1 to 18 months in control groups and immunized groups of mice exposed to various doses of tritium oxide and Cs¹³⁷. On the first day of months 1,2,3,6,12 and 18, the radiation was administered and the response monitored on days 3,5,7 and 10. The total immune responses of the experimental and the control groups for each of the observation periods and for the entire duration of the experiment are reported. For the mice exposed to either tritium or Cs¹³⁷, changes in the numbers of PFC's in the spleen and in 10⁶ spleenocytes showed similar patterns: for each month, the maximum number peaks on the 5th day after exposure and gradually decreased afterwards. The fifth-day maximum, however, increased from month 1 to month 6 then generally decreased gradually. Patterns for the changes in the number of RFC's are somewhat more complicated. During months 2,3 and 6, for mice exposed to tritium, the patterns for the numbers of RFC's are similar to those for the PFC's. For all months, for the Cs¹³⁷-treated mice, and months 1,12 and 18 for the T-treated mice, the number of cells did not decrease smoothly to its former value after the maximum. Curves for both control and immunized mice are similar. THO caused a slightly greater reduction in antibody formation than did Cs¹³⁷. References 16: 7 Russian, 9 Western.

[55-12027]

EFFECTS OF SMALL DOSES OF γ -RADIATION ON MAMMALIAN CELLS IN CULTURES

Moscow RADIOBIOLOGIYA in Russian Vol 21, No 1, Jan-Feb 81
(manuscript received 11 Feb 80) pp 109-112

MANTSYGIN, Yu. A., NAZAROVA, L. F. and KUZIN, A. M., Institute of Biological Physics, USSR Academy of Sciences, Pushchino

[Abstract] Growth rates of cultured Chinese hamster cells subjected to continuous γ -radiation of either 1.81×10^{-4} or 6.97×10^{-4} C/kg·day appear to be slightly greater than growth rates of similar but unirradiated cultures over a five-day period. However, the differences are not statistically significant as they are smaller than the variations among similar cultures. Similar growth rates are observed for control and irradiated (dosage 2.5×10^{-3} C/kg·day) cell cultures from Chinese hamsters, humans, mice and VNK-21 cells. In order to study the effects of a single radiation dose at different times during cell division, the stage of the majority of the cells in the culture can be synchronized by starving the cells for 48 hours in a medium lacking nutrients. Cell division is stimulated only when the irradiation occurs at the G1 stage. References 8: 5 Russian, 3 Western.

[55-12027]

STUDY OF CHEMILUMINESCENCE OF RAT SERUM AFTER TOTAL-BODY IRRADIATION

Moscow RADIOBIOLOGIYA in Russian Vol 21, No 1, Jan-Feb 81
(manuscript received 23 Apr 80) pp 114-116

SNIGIREVA, G. P., Moscow Scientific Research Roentgen-Radiological Institute, RSFSR Ministry of Health

[Abstract] Chemiluminescence (CL), related to the free-radical recombination and/or to the free-radical oxidation of lipids, is a sensitive indicator of radiation and other damage to organisms. The title study was carried out using radiation doses of 1.0, 2.5, 5.0 and 10.0 Grads. For those samples receiving 1.0 and 2.5 Grads, the CL increases slowly from hour 1 to hour 12 then decreases to hour 24, increases again to hour 48 reaching a higher level than previously attained, then gradually returns to the original level about hour 96. For the sample receiving 5.0 Grads, the CL initially drops rather sharply, then fluctuates around the initial value until hour 12 at which time it increases gradually to hour 48, then finally drops steadily to well below the starting value of hour 96. For the sample subjected to 10.0 Grads, the CL initially drops sharply, then increases to hour 3, again drops sharply to well below the previous value by hour 12, rises gradually to hour 48, then finally drops again lower than before by hour 96. The behavior between hours 72 and 96 appears to be a phase characteristic and may be related to the organism's defense mechanism against the radiation damage. References: 12 Russian.

[55-12027]

STIMULATION BY HEPARIN OF MIGRATION CAPABILITY OF BLOOD-FORMING CELLS IN IRRADIATED RODENTS

Moscow RADIOBIOLOGIYA in Russian Vol 21, No 1, Jan-Feb 81
(manuscript received 8 Jan 80) pp 135-138

LUKASHIN, B. P. and MOROZOVA, I. N.

[Abstract] The title study was conducted to evaluate the magnitude of the effect of heparin, previously shown to increase the distribution of blood-forming cells in the long bones, on the migration process of these cells. A single dose of heparin caused a five-fold increase in the concentration of leucocytes in the peripheral blood of mice and rats receiving LD_{40-90/30} dosage of radiation. This was accompanied by a decreased concentration in the bone marrow. The heparin acts by effecting the colony-forming units (CFU's) in the peripheral blood and bone marrow. The marrow is reduced by more than half in thigh bones of rats and mice during exposure to 15 Grads of radiation. The concentration is lowest approximately 3 hours after irradiation, then gradually increases to virtually initial values after 15 hours. The concentrations of bone marrow in rats and mice having been given heparin not only do not drop as low as those of untreated animals but also return to normal at a faster rate. The heparin acts to differing degrees to increase the migration capability of not only bone marrow but of any mobile cell by increasing its electro-kinetic potential. References 10: 8 Russian, 2 Western.

[55-12027]

TENDENCIES TOWARDS DEVELOPING TUMORS IN PROGENY OF IRRADIATED RATS

Moscow RADIOBIOLOGIYA in Russian Vol 21, No 1, Jan-Feb 81
(manuscript received 4 Feb 80) pp 138-142

PAVLENKO-MIKHAYLOV, Yu. N. and OSHCHEPKOV, A. B.

[Abstract] The title study was carried out, in which either both parents or only the males are subjected to 1 Grad of Co⁶⁰ radiation. Tumors were observed in 1% of the control group after 390 days and in 3% after 560 days. The two groups of progeny of irradiated parents showed similar values, ranging from about 1% to about 12-14% after 560 days. In addition, irradiation decreased the latent period and increased not only the number but also the variety of tumors. Females descended from irradiated males developed tumors 2.5 times more frequently than for females whose parents had both been irradiated. The average number of tumors in individuals of the former group of females is 3.2 times higher than for individuals of the latter group. No such differences are observed for the male offspring. References 7: 1 Russian, 6 Western.

[55-12027]

EVALUATING SIGNIFICANCE OF FUNCTIONAL ACTIVITY INDICATORS IN ADRENAL CORTEX
FOR PREDICTING RADIOSENSITIVITY OF INDIVIDUAL ANIMALS. PART 2. PREDICTING
RADIOSENSITIVITY IN INDIVIDUAL MONKEYS FROM DIRECT AND INDIRECT INDICATORS OF
ADRENAL CORTEX ACTIVITY

Moscow RADIOBIOLOGIYA in Russian Vol 21, No 1, Jan-Feb 81
(manuscript received 19 May 80) pp 145-148

DAREN SKAYA, N. G. and KOROTKEVICH, A. O.

[Abstract] Twenty-three monkeys were exposed to 13.93×10^{-2} C/g of ^{60}Co radiation and were divided into two groups: control group and "training" group. Two samples were taken before exposure and one sample about 5 hours after exposure for the "training" group. Parameters measured include cortisol concentration (ranging from 46.1 to 59.3 microgram% before radiation to 155.6 after), K/Na ratio in the whole blood (ranging from 1.13 to 1.02 before radiation to 0.88 after) and leucocyte concentration ($\times 1000$; ranging from 12.93 to 14.83 before radiation to 27.98 after). For the control group, the analogous values are 39.4 to 39.8 microgram% before and 87.8 after for cortisol content; 0.90 to 0.99 before and 0.75 after for the K/Na ratio; and 14.19 to 15.14 before and 22.99 after for the leucocytes ($\times 1000$). On the basis of all three parameters the "training" group was divided into three subgroups: hypo-, normally- and hyperactive. The probability P of death due to radiation sickness for any individual can be expressed in the form

$$P = 100 - Ae^{-\beta \frac{(x_i - \bar{x})^2}{\bar{x}^2}}$$

where \bar{x} is the average and x_i the actual value of one of the three measured parameters. Although the calculated P for all three parameters agrees well with actual mortality, the most information can be obtained from the cortisol concentration in the blood. References 6: 5 Russian, 1 Western.
[55-12027]

HUMAN FACTORS

UDC 331.015.11

FUNCTIONAL COMFORT: COMPONENTS AND CONDITIONS OF FORMATION

Moscow TEKHNICHESKAYA ESTETIKA in Russian No 1, Jan 83 pp 21-23

[Article by L. D. Chaynova, candidate of psychological sciences, the All-Union Industrial Design Scientific Research Institute: "Functional Comfort: Components and Conditions of Formation"]

[Text] At present research on the condition of functional comfort has developed in the independent scientific direction of engineering psychology and ergonomics. The immediacy of this direction lies in the fact that within its bounds, it is possible to find a strictly scientific solution for the important practical problems of ensuring prolonged, highly efficient labor without harming a person's health. This is achieved through studying the functional possibilities of a person performing a certain type of activity, and then applying the corresponding working conditions and machinery with the appropriate technical features.

The problem of functional comfort has arisen in recent years as a natural result of differentiated study of functional conditions in general and the condition of tension in particular. If in the past, the attention of scholars was drawn primarily to extreme conditions, such as stress, fatigue and monotony, which lead to interruption of labor processes, today they are more interested in the intermediate conditions which unite all the transitional forms of a person's internal activity, including those forms which are precursors of extreme conditions. Attempts are made to differentiate these forms.

Specifically, V. Blok [1], in studying the various functional conditions of a person from sleep to extreme excitement, came to the conclusion that the process of rapid change in the functional conditions of the brain, called activation in psychology, is expressed in intensified wakefulness. The author suggests that the various levels of wakefulness, determined by a gradual change in the level of nervous activity, form a consistent line from sleep to extreme excitement. In the graduated scale of levels of wakefulness, he places the optimal effectiveness of behavior in the pre-emotional range. This assumes that for every type of activity there is an optimal level of wakefulness.

G. Moruzzi [2] presents the graduated scale of levels of wakefulness as a natural changing of forms of behavior, where for each form there is a corresponding optimal level of activity of nervous centers.

H. Appley and R. Trumbull [3], in considering the interaction of the human organism with external surroundings, distinguish two opposing processes: on the one hand, the external environment exerts various manifestations of "pressure" on the organism, and on the other hand, the organism responds to this "pressure" with varying degrees of resistance (weak resistance, tension, and finally stress). Thus, in the opinion of these authors, tension occupies a central place in the opposing interactions.

H. Bartenwerfer [4] considers a differentiated evaluation of the condition of tension in connection with the result of the activity that has been performed and those psychological "costs" which were required; this allows him to judge the skills and experience of the worker.

In this manner, various research studies have raised the question of the necessity of a differentiated study of the condition of tension, occupying an intermediate position between extreme conditions.

The broad range of psycho-physiological research that we have conducted [5] made it possible to conclude that tension should be considered as a key functional condition accompanying any purposeful activity, expressing the degree to which the conditions of the activity correspond to the person's functional possibilities, and characterized by some degree of mobilization of the organism's nervous and somato-vegetative functions. The results of this experimental research allow us to represent the functional condition of tension as a consecutive line or continuum determined by conditions of the central nervous system and various levels of activation of functional physiological systems. Different forms of tension can arise, depending on the degree of mobilization of the organism's functions under the influence of the subject's attitude toward the activity, and other factors. The criterion for isolating them is the degree of mobilization of psycho-physiological functions, which should be adequate for the nature of the activity.

Research on the functional conditions of humans, conducted with the use of objective means for registering a complex of psycho-physiological parameters, makes it possible to establish that a quantitative measurement in differentiating levels of tension can be the psycho-physiological price of the activity [5], understood as the relationship between the energy (mental, organic) spent by the worker per unit of time and his labor productivity. It is well-known that a person's capacity for work, and consequently also his labor productivity, change over the course of his working time [5,6]. This means that the psycho-physiological price of the activity also changes at times. These changes can be caused by the condition of the entry into the work routine, fatigue, and other factors. The psycho-physiological price of activity depends on the degree to which the labor conditions correspond to the person's functional possibilities: if these factors correspond closely, then the psycho-physiological price is low, and in the opposite case, it is higher.

With a high level of labor efficiency and a low psycho-physiological price, a person's activity reaches a high degree of productivity. This corresponds to a productive, or optimal, form of tension, manifested in adequate activation of the functional physiological systems. The high results are achieved with

a price of minimal "mental" and "organic" costs, which ensure a person's prolonged and efficient ability to work. The rational expenditure of nervous energy has a favorable effect on a person's health. A high psycho-physiological price of an activity corresponds to unproductive (non-optimal) forms of tension, which disrupt the correspondence between the working conditions and the person's functional possibilities, and his "mental" and "organic" costs increase. If there is a large gap between these factors, there is a sharp fall in labor efficiency and the activity becomes disorganized. It has been established experimentally that unproductive forms of tension can arise under easy working conditions, as well as difficult ones. Unproductive forms of tension correspond to inadequate activation of the functional physiological systems.

Thus tension is a continuum, including productive (optimal) and unproductive (non-optimal) forms. These forms can be differentiated by simultaneously registering a complex of psycho-physiological parameters adequate for the given activity and reflecting the nature of activation of the functional physiological systems. Psycho-physiological indicators, determined from experimental data, make it possible also to make indirect judgements about the psycho-physiological price of labor.

A theoretical analysis of the problems of functional conditions and concrete research on different forms of tension allow us to conclude that an increase in the level of activation of functional physiological systems only up to a certain critical point leads to an increase in the efficiency of the activity being performed. Beyond this point the labor efficiency decreases. Proceeding from this, it is natural to suppose that for every type of activity there is some inherent optimal level of activation of the functional physiological systems, corresponding to the range of productive tension. Experiments were conducted to establish this level, in which the means and conditions of labor were varied [5]. The experiments showed that for every type of activity there is a spectrum of design solutions for means and conditions of labor corresponding to a person's functional possibilities. This correspondence provides a low psycho-physiological price and a high level of efficiency for the activity. Under these circumstances, a person reaches an optimal condition which we have called functional comfort.

By functional comfort, we mean the optimal functional condition under which a correspondence is achieved between the means and conditions of labor and the worker's functional possibilities. In this case a positive attitude toward the activity is formed, which provides adequate mobilization (activation) of psycho-physiological processes, the development of fatigue is postponed, and prolonged and highly efficient working capacity is promoted without harming the person's health.

Research has made it possible to establish that an important condition which to a significant degree helps ensure adequate activation when a person is being included in an activity, is the person's own knowledge of the functional possibilities that are applicable to the conditions and content of the activity. As soon as a person believes that his own internal resources are sufficient for performing an activity, it will be possible to establish an adequate level of mobilization of psycho-physiological functions and a favorable base is

created for continued activity, from which the worker obtains internal satisfaction. This form of internal and external connections gives rise to functional comfort. Disruption of these connections leads to functional discomfort, which corresponds to unproductive forms of tension. Thus, functional comfort, being an optimal condition, enters the continuum of tension and represents a systematic formation which includes psychological and psycho-physiological components as its base, and is characterized by efficient performance of an activity. Functional comfort is an active condition tied to a certain stable mobilization of a person's nervous and mental functions and directed at realization of a goal of activity, which plays a system-forming role.

Levels of comfort and discomfort can be determined with the aid of a set of psycho-physiological parameters and their numerical indicators. These indicators are dependent on the individual characteristics of the person and the type of activity. They are grouped in specific zones of comfort and discomfort and they vary within the zones. Figure 1 represents the structure of the concept of functional comfort with all the connections between the separate components.

The psychological component of functional comfort is demonstrated in satisfaction from work--in an adequate attitude toward the goal, process, content and conditions of the activity. The key point here is the attitude toward the goal of the activity, which determines the activity level of functional comfort.

Characteristic of functional comfort is a combination of a high appreciation for the goal of the activity and high indicators of all the other factors providing work satisfaction [8]. In the opposite case the condition of functional discomfort arises. Various types of this condition can be brought on by an insufficient workload under easier working conditions, as well as by an overload of work with significantly complicated working conditions. This results in a disruption of the correspondence between the working conditions and the person's functional possibilities and internal resources, which can reduce or even completely eliminate job satisfaction.

The psycho-physiological component of functional comfort is manifested in productive tension and the corresponding adequate activation of the functional physiological systems. It is expressed in the relationship of the work that has been performed to the "mental" and "organic" costs, that is, in a minimal psycho-physiological price of the activity. When a person's functional possibilities do not correspond to the means and conditions of labor, this leads to an increase in "mental" and "organic" costs necessary to maintain the required level of efficiency in the activity, which gives rise to a condition of functional discomfort. Experimental research on various types of activities has shown that there is a continuum of conditions of functional discomfort, which are manifested in two forms: when the functional possibilities of a person are not fully utilized (the operator is underloaded), and when the person's functional possibilities do not provide the required level of performance of the activity under complex conditions (the operator is overloaded with information, he is not able to perform the necessary volume of operations at the given rapid work rate, and so on). Experiments have shown that in a number of cases, the first form of functional discomfort corresponds to a higher psycho-physiological price of activity than does the second form [5].

We will offer as an example some results of experimental psycho-physiological research on one type of practical mental activity, during which various levels of the functional condition of tension were produced by varying the rate of work [9]. During the experiments which were conducted on a group of operators, EEG recordings were made from the frontal and occipital sections of the brain. After statistical processing of the data that was obtained, the relationship between the average output values forming the EEG spectrum and the rate of work was established for ranges of the delta-theta rhythm frequencies (figure 2). We note that, strictly speaking, the condition of functional comfort is produced when the rate of activity corresponds to the lowest points in the curves of the average output values of the brain's bioelectrical processes.

Thus the condition of functional comfort, from positions of a systematic approach, is a complex formation. Knowledge of its basic components and the numerical values of the condition's indicators makes it possible to implement optimization of concrete types of labor activity and conditions and tools of labor with ergonomic and engineering and psychological design. Optimization of labor activity can be realized according to the criterion of functional comfort, which assumes a minimum psycho-physiological price of activity and a high, or given, efficiency for the work performed. However, this should not be understood to be the achievement of the extremum of some function. Functional comfort is usually a continuum of conditions, close to the optimal, which occupies a narrow range between the two forms of functional discomfort. The size of this range depends on the scattering of psycho-physiological indicators of different individuals and is defined using methods of mathematical statistics. In other words, for each person performing a certain type of labor activity, there is a specific set of conditions and characteristics of the means of labor under which the condition of functional comfort is formed. Many of these conditions and characteristics corresponding to different types of labor, fall into a generalized multivariate range with an accepted (given) probability. For separate types of activity, when only one condition can be varied, for example, the rate of work, this range can be transformed into a univariate one (see figure 2). By means of optimization, that is, by making directed changes in these conditions and characteristics, they can be made to fall into the generalized range.

Thus optimization of activity according to the criterion of functional comfort is realized through the effect of means and conditions of labor on a person's functional condition, with the aim of providing prolonged and highly efficient working capacity with no harm to the person's health.

Figure 1

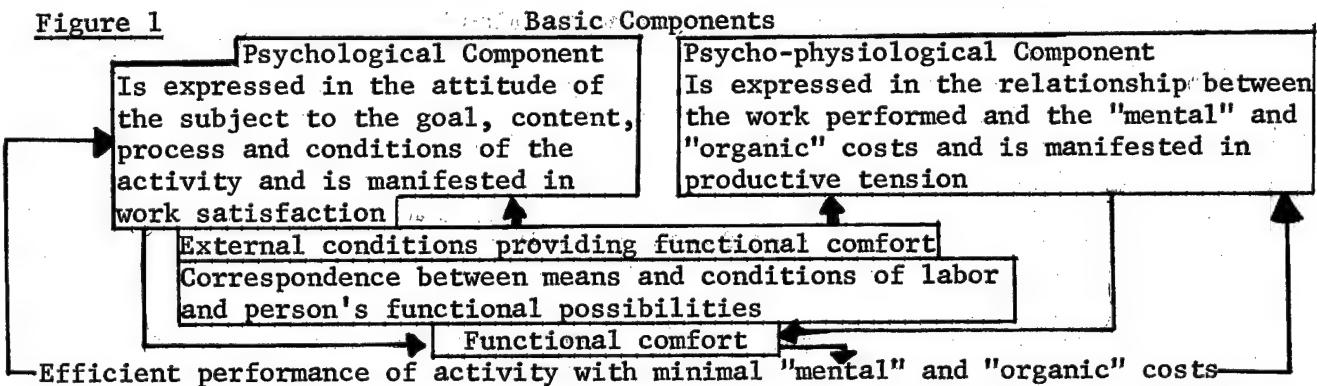
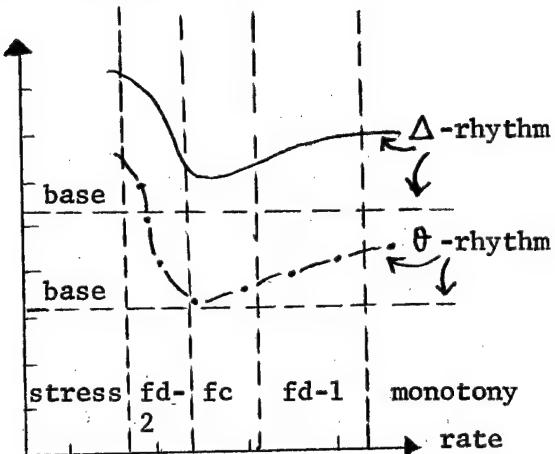


Figure 2

$R(t)$ relative to one



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CSO: 1840/298

PSYCHOLOGY

PSYCHOLOGISTS OFFER VOCATIONAL COUNSELING SERVICE

Moscow UCHITEL'SKAYA GAZETA 13 Jan 83 p 3

[Article by N. Kurochkin: "Report from the Scientific Laboratory. Psychologists Conduct Consultation"]

[Text] There is an advertisement in the newspaper SEVERNYY RABOCHIY which reads: "Attention students of grades 8-10. If you are having difficulty in selecting a profession, you may obtain the consultation of a qualified psychologist at the professional consultation office of Yaroslav State University. The consultation office will be open beginning December 15 on Wednesdays and Fridays from 14 to 17 hrs. The office is located at: Yaroslavl', Sovetskaya Street, 10, Auditorium 309".

It happened to be Wednesday, and I called the telephone number given in the ad. A man's voice asked:

"Do you want to have a consultation?"

"No.. I want to get an interview. May I?"

"Of course".

...The dean of the department of psychology, the chairman of the department of labor psychology and engineering psychology, Docent Mikhail Mikhailovich Knyazev, and assistant Valeriy Yemel'yanovich Orel were talking with a young girl.

"In general", she confessed, "I have already chosen a profession..."

"Which one?"

"Well", the girl blushed slightly, became somewhat embarrassed, and then announced with some defiance, "I want to be a salesperson".

M. M. Knyazev and V. Ye. Orel did not take up the challenge.

"Well, its a good business. Who recommended this to you?"

"My mother... the girls..."

"And what store do you hope to work in?"

"The 'Melodiya' company or in a cosmetics shop".

The girl was given an appointment date. When she left, I asked M. M. Knyazev, "Why does she need a consultation? After all, she has already made her choice".

"We get many such people", explained Mikhail Mikhaylovich. "Some need to be reassured of the correctness of their decision. Others want to be 'armed' with our advice for conversations with relatives, with friends, for admission to institutions of higher learning, for work. This category of visitor is the most difficult for us. We warn them all ahead of time that our advice bears a consultative, i.e., not a mandatory character".

"Our office", continued M. M. Knyazev, "was organized with public funds three years ago at the initiative of the former department chairman, today the rector of the Yaroslavl' Pedagogical Institute and corresponding member of the USSR Academy of Pedagogical Sciences Vladimir Dmitriyevich Shadrikov. Many young people come here, primarily students of the 10th grade. And this does not make us very happy. One should start thinking sooner about one's future profession. We work with each one in several sessions. Thus, our work load is great--up to ten people per day. It is true, however, that recently we have started limiting appointments".

"And what character does your consultation bear?"

"First of all", stressed Mikhail Mikhaylovich, "we do not recommend a concrete profession, but a sphere of activity. For this purpose, we have divided all professions into two groups and designated them as Man--Man and Man--Technology. In the first case we are speaking of working with people. I might note that now this type of activity is the most popular among young people. In the second case we are speaking of machine labor.

We check the personality traits. We determine capabilities, weaknesses and shortcomings. Thus, for example, we will try to find out the following about the girl who just left here: does she get along well in her contacts with people, is she sufficiently patient, is she suspicious, etc. If we find character traits which are incompatible with the work of a salesperson, we will try to convince her to change her selection."

"What is the effectiveness of your consultations?"

"That's difficult to say. The young people themselves, as a rule, do not feel the need to inform us of their subsequent actions, and schools are not very willing to answer our questionnaires. But the information which we nevertheless have at our disposal convinces us of the fruitfulness of our efforts".

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CSO: 1840/346

UDC 575.1:599.323.4

MOTOR AND EMOTIONAL CORRELATES OF SELECTIONS FOR HIGH AND LOW AVOIDANCE STRAINS OF RATS

Moscow GENETIKA in Russian Vol 19, No 1, Jan 83
(manuscript received 2 Jun 81; in revised form 15 Mar 82) pp 121-124

RYZHOVA, L. Yu., KULAGIN, D. A. and LOPATINA, N. G., Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad

[Abstract] Open-field studies were conducted on strains of rats bred for high and low avoidance responses to correlated learning behavior with motor activity and emotional (defecation) status. The results revealed a divergence in the ability to learn active avoidance behavior and the level of motor activity and emotionality. The low avoidance strain showed low motor activity and high emotional level, while the high avoidance strain of rats presented with the reverse correlates. Furthermore, the level of motor activity in low avoidance rats was lower than in the parental or original Krushinskiy-Molodkina rats (KM rats), and the emotional status greater than in the KM rats. These observations underline the genetic basis of the ability to learn avoidance in relation to emotional (motivational) status and the fact that high emotional reactivity does not favor acquisition of conditioned avoidance. Figures 1; references 14: 6 Russian, 8 Western.

[299-12172]

UDC 591.58:598.2

THEORETICAL AND PRACTICAL ASPECTS IN USE OF ACOUSTIC REPELLENTS AGAINST BIRDS

Moscow BIOLOGICHESKIYE NAUKI in Russian No 6, Jun 82
(manuscript received 19 Dec 80) pp 27-32

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[Abstract] Analysis of adaptive features in repellent reactions, including bird alarm and distress call, is of paramount importance for further successful development of ways to control bird behavior. To this end, during the period 1977-1980 recordings were made of alarm and distress signals in more than 50 species of birds and an analysis made of their spectral structure using a "Spektr-1" dynamic analyzer and a Kay Electric sonograph (model 7029A, United States). The differences in alarm and distress signals in various types of birds are described and the sonograms considered. Geographical factors are

considered; since many variations are involved, further study of larger samples is required, and also of sex differentiation, in order to clarify this aspect. The defensive responses of birds to alarm and distress calls are discussed. Analysis of findings show that it is possible to distinguish frequency and amplitude patterns in alarm and distress calls. Recent experiments to repel birds with artificial calls are described. Figures 1; references 13: 10 Russian, 3 Western.
[303-9642]

UDC 612.821.6+612.821.7+612.822.3

FORMING CONDITIONED MOTOR RESPONSE IN NIGHT SLEEP ON BASIS OF VERBAL REINFORCEMENT

Moscow BIOLOGICHESKIYE NAUKI in Russian No 6, Jun 82
(manuscript received 18 Jun 81) pp 49-53

ARONS, Ye. K., VASIL'YEVA, V. M., VOLKOV, Ye. V. and KRONKOLM, E.,
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[Abstract] The ability of the sleeping brain in man to perceive and differentiate stimuli has long been known, and the question arises of whether it is possible for the brain to perceive and react to verbal reinforcement specific for man during sleep. To this end a study was made of the feasibility of forming a conditioned motor reflex on the basis of verbal reinforcement during night sleep. The experiment was conducted in 8 subjects aged 17 to 31. Attempts were made to produce a conditioned motor reflex (clenching the fist) using an arbitrary signal (150 hertz at 25 dB above threshold level) reinforced verbally, over a period of 3 nights. The EEG, EMG and EOG were recorded using standard methods. Findings showed that conditioned motor reflexes can be produced in subjects in the experimental conditions; this occurs NREM and REM phases. The reflex was manifest in the motor response to the verbal command and motor or EMG responses when the command was stopped. Formation of the reflex progressed through the 3 nights of the experiment. It was thus shown that it is possible to form a conditioned motor reflex in a sleeping subject. The findings are discussed in terms of relationships between EEG and EMG readings and their significance. Figures 2; references 14: 3 Russian, 11 Western.
[303-9642]

ROLE OF PSYCHOLOGIC FACTORS IN CURRENT CLINICAL MEDICINE

Moscow SOVETSKAYA MEDITSINA in Russian No 12, Dec 82
(manuscript received 13 Oct 81) pp 91-98

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imeni V. M. Bekhterev

[Abstract] This is a review type article based exclusively on Soviet literature. Freud's concepts of "unconscious" have been downgraded in favor of Prangishvili's concept that the unconscious is an active brain process regulating human behavior accepting a nonrealizable information. The psychologic factors in today's clinical medicine grow in importance. Medicine undergoes a sort of humanization, being invaded by psychological and sociological considerations. Psychotherapy is common in a wide area of application from treatment of psychological disorders to preventive practice in individuals found in exceptional situations (astronauts, seamen, sportsmen, etc.). The concepts of normal state and rehabilitation are challenged and redefined; as are the classical views on the relationship between patient and doctor. It was concluded that intensified attentiveness to psychological factors of a disease will assure further development of psychoprophylactic and psychotherapeutic approaches supplementing the rehabilitation processes. References: 28 Russian (3 by Western authors).

[259-7813]

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